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THE UNIVERSITY OF ALBERTA

AN EXPERIMENTAL APPROACH TO GRAMMATICAL MOOD

by

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A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "An Experimental Approach to Grammatical Gender", submitted by Christine [illegible] in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Psycholinguistics.

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DEDICATION

To the memory of my grandmother,

[illegible]

ABSTRACT

This study is an experimental investigation of the semantic notion of focus. Certain syntactic and phonological realizations of focus are discussed within the framework of current grammatical theories. An experiment was performed in order to investigate the possible focusing properties in English of passivization, adverb shift, and contrastive stress.

[illegible] [illegible] subjects were presented with twenty sentences which varied systematically according to voice, adverb position, and placement of contrastive stress. The subjects' task was to rank-order the nouns and the verb within each sentence, first singly, then in pairs and triplets, according to their importance to the meaning of the sentence.

Analyses of the data showed that voice, adverb position, and contrastive stress each had a significant effect on the subjects' rankings. The results further demonstrated that front-shifting and contrastive stress are two effective focus devices. The study concludes with a discussion of some implications for grammatical theory.

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CHAPTER ONE

INTRODUCTION

1.1 Notions of Focus

The purpose of this study is to investigate experimentally some aspects of grammatical focus in English, where "focus" is used as a general term, roughly equivalent to "emphasis." Thus, to focus a sentence constituent is to make it semantically prominent. The starting point of the inquiry is a consideration of focus as it is understood in various abstract accounts within current theories of transformational generative grammar (TGG).

The value of an experimental approach lies in its ability to provide a solid data-base, which is separate from the investigator's intuitions, and from which more objective generalizations are to be extracted. Experimental work concerning focus can therefore play an important role, both in evaluating existing theories and in guiding further investigations toward a unified theory of focus. However, in order to describe the goals of an experimental study in relation to current theories of TGG, the relevance of such theories for the psycholinguist requires clarification. In the psycholinguistic literature, the two questions most considered to be a model of both the language product and the language process; often these two roles have been confused.

TG as a Model of the Language Process

Hypotheses of many of the initial psycholinguistic experiments within the TG framework were variations of the "correspondence hypothesis" (Hayes, 1970, p. 5). That is, they reflected the belief that the grammar was indeed a model of the language process. It is interesting to note that these early experiments were all concerned with the transformational component of the grammar. Greene (1972, p. [illegible]) has suggested that this component was investigated first because the phrase structure component describes a process that is "counter to every intuition that people start with 'what they want to say' and only then generate an appropriate sentence to express it." For Greene, the phrase structure component is "most implausible" as a psychological model.

These experiments were originally regarded as highly successful. For example, Miller and McKean (1964) hypothesized that speakers produce sentences by first generating a kernel sentence and then applying transformations to it; their results were interpreted as supporting the psychological reality of kernel sentences and transformations. Similarly, Mehler and [illegible] ([illegible]) have pointed out that the Miller and McKean results cannot reasonably be interpreted in this way. Their argument is independent of the methodological difficulties and foundational inadequacies for which this and other early studies have also been criticized (for a discussion of these, see Wall, 1972, pp. 12-18).

The early evidence, then, was questionable. Subsequent experiments (e.g., Slobin, 1966; Perfetti, 1969), which sought to extend the original encouraging results, met with less "success." As a result, the correspondence hypothesis lost some of its early popularity.

TGG as a Model of the Language Learner

The psycholinguistic experiments, then, did not support the early enthusiastic notion that TGG provided a model of the language learner. This, though, was not actually the intent of TGG, according to Chomsky (1965, p. 9):

> When we say that a sentence has a certain derivation with respect to a particular generative grammar, we say nothing about how the speaker or hearer might proceed, in some practical or efficient way, to construct such a derivation.

If this view is accepted as a statement of the scope of TGG, then the proposal is not vulnerable to criticism from experiments which investigate the language processor. However, many other statements by Chomsky can be interpreted as meaning that TGG *is* intended to provide a model of the language process. For example, Chomsky has stated (1966, p. 75, n. 2) that a TGG "constitutes a hypothesis as to how the speaker-hearer interprets utterances." The correspondence hypothesis is not a farfetched interpretation of such a claim.

For the present study, the weaker claim -- that TGG provides a model of only the language product -- is of interest. However, if a correspondence between the language process and the rules of a TGG is not claimed, then the relevance of psycholinguistic experimentation as a test of the model's adequacy is not immediately clear. The necessary link is provided by Chomsky's notion of "descriptive adequacy." In order for a TGG to be descriptively adequate, Chomsky (1965, p. 24) maintained that its output -- the structural descriptions it assigns to sentences -- has to match the intuitions of the native speaker concerning such sentence properties as acceptability, paraphrase classes, and ambiguity (see Derwing, 1973, p. 160). In psycholinguistic experiments, such native speaker judgments about sentences can be collected. Clearly, these intuitions provide data only about surface properties of the given sentences; such experiments are not expected to yield information about the psychological reality of the grammar's mechanisms for providing the structural descriptions, or for relating deep and surface structures.

The structural descriptions which the TGG assigns constitute psychological predictions if the grammar is claimed to be "descriptively adequate," in Chomsky's terms. These predictions can be tested, at the surface structure level, against language-user judgments. If this kind of check is done for a carefully chosen, grammatically well-defined set of sentences, then the results may provide a useful test of the grammar's descriptive adequacy.

For example, Fletcher (1973) showed that native speakers reliably observe meaning differences among clefted sentence constructions which the Standard Theory Model (STM)[1] defines as systematic paraphrases. Thus, the STM was found to be descriptively inadequate as a reflection of native speakers' intuitions about the meaning-equivalence of clefted sentences.

TGG Accounts of Focus

An aim of the present study is to investigate the descriptive adequacy of the grammatical accounts of focus. Theories of TGG have only recently tried to account for focus, which is therefore represented somewhat differently in the various grammatical models. In revised versions of the Standard Theory (Chambers, 1970; Jackendoff, 1972), arbitrary markers have been proposed, either at the deep or surface structure level, to account for focus. The markers, of course, are not intended to appear randomly in feature matrices; they are introduced to reflect certain psychological properties of the marked constituent. One common psychological attribute of a focused constituent, in the view of several linguists at least (e.g., Chambers, 1970; Chafe, 1970; Chomsky, 1971; Jackendoff, 1972) is its increased importance, relative to other constituents in the sentence and to its own normal or "unmarked" status. This increased importance of a focused constituent is reflected at the surface structure level, because the associated markers are in turn linked to well-defined changes in the derivation of the sentence.

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[1] The STM is the TGG model proposed by Chomsky, 1965.

That several grammatical constructions should be treated as realizations of focus has been proposed on intuitive grounds (e.g., Chambers, 1970, p. 27); a few observations of this kind have been incorporated into TGG models. These grammatical constructions can be conveniently divided into two groups -- those involving syntactic permutations, hereafter called "syntactic focus devices," and contrastive stress, which involves no reordering of constituents.

The linguistic background to this study consists of a discussion of the various theoretical accounts of syntactic focus and contrastive stress. Following this, some typical studies from the experimental literature on focus are examined. Then, the various grammatical descriptions and predictions concerning focus are discussed for the sentence types of interest in this study. The experimental data, discussed in the later chapters, will provide a basis for evaluating these grammatical descriptions.

The Experimental Data

In this study, grammatical predictions about focus were measured against native speakers' judgments about the relative importance of the various constituents of each sentence in a set. For simple dative sentences, such as (1), subjects were asked to rank order the three NP's and the verb according to their importance to the meaning of the sentence:

(1) John gave the book to Andrew.

The sentences, which were presented aurally, varied from the basic sentence (1) in terms of sentence voice, indirect object position, and location of contrastive stress. From the distribution of responses, information was obtained about the subjects' judgments concerning the importance of the constituents of the sentence. For the sentence types under investigation, the experiment revealed, by comparing the effects of passivization, contrastive stress, and dative movement, which grammatical properties were operative in altering focus. This result was then compared with the theoretical predictions concerning focus.

CHAPTER TWO

SYNTACTIC FOCUS DEVICES

Preliminaries

At the base of any interest in the question of syntactic focus is an interest in semantics, and in particular, an interest in how users of a language convey differences in meaning by using syntactic constructions. Because approaches to semantics have varied widely among linguists, so have accounts of syntactic focus. Linguists such as Halliday recognized the importance of focus, but made no attempt to formalize the notion. Early transformationalists, on the other hand, ignored semantics as much as possible, and therefore did not so much as mention syntactic focus. During this stage of linguistic development, at least for Chomsky and his followers, interest centred on discovering syntactic patterns among sentences which are related in meaning. They therefore discussed only the syntactic structure of the sentences, and provided simple rules in an effort to express what they saw as the close and natural relations between these sentences. No attempt was made to discuss meaning equivalence itself.

In *Syntactic Structures*, Chomsky (1957, p. 90) viewed a declarative sentence and its corresponding WH-questions as being "understood in a similar manner." This was the closest he came to discussing meaning equivalence. It is not surprising that during this period, when all efforts were directed toward expressing certain syntactic relationships which hold among sentences, no attention at all was given to considerations of syntactic focus devices. These would represent syntactic ways in which the language user expressed differences in meaning, whereas Chomsky's task was to formalize the way in which the language user perceived similarities in meaning among different syntactic structures.

Transformationalists did not long confine their interest solely to syntax, however. In 1963, Katz and Fodor introduced some ideas regarding what the semantic component of a grammar should be like. The relation of the semantic component to the syntactic and phonological components was discussed in 1964 by Katz and Postal. In particular, they suggested that transformations be "meaning preserving." Again in their work, as in Chomsky's earlier works, there was no attempt to get at the problem of meaning equivalence. In Aspects of the Theory of Syntax, Chomsky (1965) adopted the Katz - Postal principle and also refined his earlier notion of meaning equivalence by stating that rules such as interrogation and negation were not meaning-preserving. Interest at this time was still centered on syntax, although the effect of consideration of a semantic component was showing up in discussions of syntax.

Further refinements in the notion of meaning equivalence were formulated, although still no attempt was made to classify the various notions of meaning equivalence or their implications for grammatical theory. In 1969[1], Chomsky proposed that some transformations do not preserve meaning. Further, he attempted to characterize how much meaning changing occurred in the transformational component, and whether such meaning changes were restricted to a particular kind of meaning. It was then that syntactic focus re-entered the linguistic stage, and linguists began to talk about subtle changes in meaning introduced by such devices. Since 1969, some work has been published on the formal nature of focus devices, but little effort has been made to back up the theoretical claims with experimental evidence.

Meaning Equivalence

There has been a recent trend, as discussed above, to recognize that the class of syntactic phenomena previously grouped together as stylistic variants contains some syntactic relationships that may be considered to reflect changes in focus. Recognition of this refinement depended on noticing a corresponding refinement in the notion of

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1. This proposal appeared first in mimeograph form. It was later published as Chomsky (1971).

meaning equivalence, and a reduction in the number of syntactic structures that may be considered to belong to a single equivalence class. Only very recently, however, has any comprehensive attempt been made to come to grips with the problem of meaning equivalence. Since this is a very basic problem to grammatical theory, and particularly since lack of work in this area has prevented a satisfactory formalization of the notion of syntactic focus, some discussion of meaning equivalence is required here.

Passivization itself is one transformation which is classified differently in various models of transformational grammar. This inconsistency reflects a pervasive confusion about the nature of semantics. In the Standard Theory, passivization is semantically insignificant, or meaning-preserving. In Chomsky's later revisions of the Standard Theory, as exemplified in such papers as Chomsky (1971), passivization is meaning changing, but in a more subtle way than are transformations such as negation. For this reason, Chomsky (1971) still did not see such meaning changing as occurs in passivization to be a threat to the existence of a deep structure level at which the meaning of the sentence is completely specified.

In contrast, the generative semantics point of view is that any type of meaning changing should be removed from the transformational component of a grammar; the underlying structure must therefore reflect eventual surface constructions such as the passive. Thus, generative semantics makes no distinction between the extent of meaning change brought about by passivization and that caused by negation.

A look at some recent experiments in psycholinguistics (Clifton & Odom, 1966; Miller, 1962; Mehler, 1963; Fillenbaum, 1971), also provides striking evidence that linguists are not in agreement on how to interpret the notion semantics , and especially the relation between semantics and syntax. In explaining their own experimental results, and in attempting to eradicate the confusion of these earlier studies, Baker, Prideaux, and Derwing (1973) found it convenient to define semantics in two independent categories, which they called semantics of content (Sc) and semantics of type (St). Sc, in their terms, refers to "the specific lexical items and the functional relationship among them"; St refers to "the semantic significance of a specific syntactic pattern [p. 24]." It is interesting to note that in this study, syntactic patterns involving negation, interrogation, and passivization were all classified as St phenomena. Passivization, then, was not viewed simply as a focusing device by Baker et al. , who nonetheless found that passivization differed in some way from negation and interrogation. They concluded that "differential semantic weight" might be considered as a device in the grammar to mirror the difference they found in the language user's approach to these three transformations.

The problem of interpreting the notion *semantics* can be approached from the point of view of clarifying the various opinions advanced by linguists regarding meaning equivalence and paraphrase sets. This was the approach taken in a study by Fletcher (1973), who proposed a three-way distinction in the use of the term -- semantics of content (Sc), semantics of mode (Sm) and semantics of discourse (Sd). Fletcher's definition of Sc is the same as that given by Baker *et al.* Sm[1] is seen as including those "aspects of structure which signal the 'attitude' of the speaker towards the content-semantics of the utterance [Fletcher, 1973, pp. 15-16]"; examples would include negation and interrogation transformations. Sd involves the linguistic context of the utterance, which may affect the order of items in a sentence; focus and topicalization are examples of Sd phenomena.

By considering semantics in these three categories, Fletcher was able to make some interesting observations concerning the literature. First, it was approximately Sc-equivalence that concerned Zellig Harris (1957) and Chomsky (1957) in defining equivalence classes of sentences, or sentence families. For example, Chomsky suggested that a kernel sentence and its question transforms, such as 1(a)-1(d) below, are "understood in a similar manner" (1957, p. 90):

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[1] Hereafter referred to as semantics of type (St), which replaces the earlier definition of St given by Baker *et al*.

(1) (a) John ate an apple.
(b) Did John eat an apple?
(c) What did John eat?
(d) Who ate an apple?

Here, Fletcher pointed out, only sentences 1(a) and 1(b) are Sc-equivalent. In drawing attention to the similarities among sentences such as 1(a)-(d), Chomsky opted for equivalence classes which are somewhat wider even than Sc-equivalence classes.

Within the Standard Theory, syntactic paraphrase is defined by (Sc + St)-equivalence, which Fletcher (p. 18) called paraphrase' (P') equivalence. Thus, sentences 1(a)-(d) given above would all fall into different equivalence classes, but sentences 2(a)-(c) below would all belong to the same class. That is, 2(a)-(c) are syntactic paraphrases in the Standard Theory:

(2) (a) Did John eat the apple?
(b) Was the apple eaten by John?
(c) John ate the apple?

As concern with semantics grew, however, it became obvious that the paraphrase classes allowed by the STM could be further divided. Fletcher argued for a distinction between St and Sd, on the basis that discourse phenomena such as focus and topicalization, which were not considered semantically relevant in the STM, and which therefore were not included in defining SE-equivalence, was in fact an psycholinguistically relevant. Thus, two sentences which are SE-equivalent may not be equivalent when linguistic context is considered. He therefore defined [illegible]-equivalence to be [illegible] as a [illegible]-equivalence. This is a strong form of sentence-equivalence, but Fletcher hypothesized that in a situation where context is provided, subjects would be able to pick out [illegible]-equivalent subsets from SE-equivalent sets.

Certainly, the distinction between [illegible] and SE is an important one. On the one hand, failure to make the distinction created much confusion among linguists discussing meaning equivalence; its inclusion in the theoretical framework reduces this confusion and allows one to better understand the apparent discrepancies among linguists. On the other hand, this distinction is valuable to a discussion of syntactic focus, because it points out an important distinction, with respect to the semantic role of focus, between the claims of the Standard Theory and those of later refinements to the theory. Thus, focus phenomena were seen as semantically empty in the STM; later refinements of the theory were motivated in part by a consideration of focus.

Halliday's Treatment of Theme

Halliday's discussion of focus in English, although not developed within transformational theory is, nonetheless, of particular interest, for two reasons. First, Halliday developed his ideas on focus within a semantic framework consisting of three areas of meaning, which are much like the areas of IC, IR, and ID discussed above. For each of these three semantic areas, there is a corresponding area of syntactic options, which he called transitivity, mood, and theme (1967, p. 199):

> Transitivity is the set of options relating to cognitive content, the linguistic representation of extralinguistic experience... Mood represents the organization of participants in speech situations, providing options in the form of speaker roles: the speaker may inform, question or command; he may confirm, request confirmation, contradict... Theme is concerned with the information structure of the clause; with the status of the elements... as components of a message; with the relation of what is being said to what has gone before in the discourse...

Within the area of theme, Halliday discussed six related sets of syntactic options. Of these, "information" and "thematization" are of interest here. Options in the information category "are realized by phonological features of information," while "those of thematization [are realized] by the sequence of elements in the clause [p. 200]." The term "theme" is used both as a general cover term, corresponding to "focus" in the present study, and as a specific function in the distribution of information in the clause.

Halliday proposed that an utterance be divided into information units, each one realized phonologically as a tone group. One information unit would correspond to one clause in the "unmarked" mapping of information structure onto sentence structure, although in marked options the information unit could be more than or less than one clause. By his selection of information units, then, the speaker is said to organize his message into a linear arrangement.

The selection of points of information focus, which are points of prominence within a message, is made for each information unit. The information focus is realized by the assignment of the tonic in the tone group. Information focus is thus a kind of emphasis within Halliday's framework. Further, the focus of the information unit is seen by Halliday to represent the information which the speaker deems not to be recoverable from the preceding discourse. This information, which determines the domain of focus, is assigned the function "new." In general, the domain of focus consists not just of the tonic component, but of "the highest rank constituent within which the syllable that is tonic is the last accented syllable [p. 207]." Thus for each information unit, the intonation pattern reflects what information is "new" and what is "given." There is a tendency, Halliday noted, for non-focal material to precede the focus in the information unit. However, Halliday's system includes word order as a separate aspect of thematic organization from intonation. The syntactic option which is realized by the sequence of elements in the clause is that of "theme-rheme." The theme is assigned initial position in the clause, and the rheme is what follows.

Thus, Halliday viewed intonation pattern and word order as independent aspects of the clause. He distinguished the functions "given" and "theme" in the following way (p. 212):

> ...'given' means 'what you were talking about'..., 'theme' means 'what I am talking about'.

Halliday noted though, that "theme-rheme" and "given-new" are related, in that the focus of information in the unmarked case falls within the rheme.

In Halliday's terms, an information unit with unmarked focus does not imply any preceding information, or specific question. The domain of such unmarked focus may be the entire information unit. Thus "JOHN painted the shed"[1] implies a specific question such as "Who painted the shed?", and is thus an example of marked focus. However, "John painted the SHED" may simply imply "What happened?", rather than necessarily implying a specific question like "What did John paint?" An information unit with unmarked focus is ambiguous with respect to its structure specification, which may be either "given-new" or just

---

[1] The position of the tonic is indicated by capital letters.

"new." Halliday stated that the ambiguity tends to be resolved in informal speech; for example, contrastive tone would imply specific focus on "the shed," while normal intonation would suggest the other interpretation (p. 208).

Unmarked focus, then, is realized as the location of the tonic on the final lexical item of the information unit; it assigns the function "new" to the focal element but does not specify the rest of the information unit. Marked focus -- any other location of the tonic -- assigns the function "new" to the focus, and "given" to the remainder of the information unit.

Thematization, or the assignment of functions "theme" and "rheme," is developed in less detail by Halliday, and in general has had little impact on transformational work. As mentioned earlier, the theme is what comes first in a clause. In declarative sentences the unmarked theme is the surface subject. Thus the passive can be regarded as an option in which the theme remains unmarked, and in which the agent is non-thematic. In fact, the passive allows the agent to be omitted, and this is the most frequent use of the passive (Svartvik, 1966, p. 141).

Halliday viewed the passive as having the effect of emphasizing both the agent, if it is specified, (as the point of new information) and the surface subject (as what the message is about). In terms of Halliday's notion of domain of focus, the passive could be regarded as emphasizing the agent if it is the specific focus, signalled for example by contrastive stress, but not emphasizing the agent if the domain of focus is the whole information unit. Halliday did not make this distinction, however. Thus, word order (theme-rheme) and intonation (given-new information) are two basic sets of syntactic options in Halliday's account of the grammar of discourse. The influence of Halliday's work concerning the information functions within the area of theme is readily seen in the more recent transformational accounts of focus which are discussed below and in Chapter Three.

Early TGG Accounts of Syntactic Focus

As mentioned earlier, focus devices are Sd phenomena, and were not discussed in the development of the theory of transformational grammar until the late 1960's, after the more obvious areas of Sc and St had been discussed. However, despite the fact that the term focus was not introduced until recently, passive and dative movement rules were present in transformational grammars at a relatively early date; their interpretation and their influence on evolving transformational theories are discussed here.

Zellig Harris

Harris' work in the 1950's is the place to begin a discussion of the treatment by transformational grammars of meaning equivalence, since it was he who introduced the notion of transformation to linguistic theory. However, Harris' transformations were developed with minimal reference to meaning; the emphasis was on studying combinatorial properties and, in particular, the individual co-occurrences of classes of morphemes.

In Harris' theory, transformations are defined only for those constructions which have classes with approximately the same co-occurrences. For example, most triples of N^1, V, and N^2 in the active sentence $\underline{N^1}\ \underline{v}\ \underline{V}\ \underline{N^2}$ can be found in the passive sentence $\underline{N^2}\ \underline{v}\ \underline{be}\ \underline{Ven}\ \underline{by}\ \underline{N^1}$. Thus, the following sentences are related by a reversible transformation (1957, p. 160):

(3) (a) The kids broke the window.
(b) The window was broken by the kids.

Harris noted (p. 161), however, that "some major element of meaning seems to be held constant under transformation." His description of possible meaning differences is particularly interesting, since two of the differences he mentioned are examples of what have here been called Sd and St (p. 162):

> There may be [Sd] differences in emphasis or style, as between the active and the passive. And certain transforms have specific [St] meaning differences associated with the specific morphemes they add, as between assertion and question.

He concluded:

> But aside from such differences, transforms seem to hold invariant what might be interpreted as the [Sc] information content.

For Harris, then, the similarities between transforms are characterized by Sc invariance, while the differences can be classified as those of Sd or St. Although Harris classified the difference in meaning between actives and passives as one of emphasis, this suggestion was not picked up for several years by the transformational grammarians, probably because they were more influenced by Chomsky's claim (1957) that the semantic link between actives and passives was unclear.

Chomsky: Syntactic Structures

In *Syntactic Structures*, Chomsky viewed active and passive sentences as being syntactically related (1957, p. 43):

> If S^1 is a grammatical sentence of the form
> $NP^1 - Aux - V - NP^2$,
> then the corresponding string of the form
> $NP^2 - Aux + be + en - V - by + NP^1$
> is also a grammatical sentence.

Further, only the active sentence is included in the kernel, while the transformation involved is that which interchanges NP^1 and NP^2, and replaces *V* by *is* + *V* + *en* + *by* (p. 77). Thus, passive sentences are derivationally more complex than active sentences, in Chomsky's model.

Chomsky's attempt to formulate grammar as independent of semantics was not successful. In order to show that transformations increase the adequacy of a grammar, he was obliged to discuss sets of sentences which are "understood in a similar manner," such as the sentence "John ate an apple" and its question transformations which were mentioned earlier as sentences 1(a)-(d). In motivating the idea of transformations, Chomsky (1957, p. 91) claimed that they provide a simple way of relating such sentences, in a way such that "any speaker of English will understand these sentences according to this pattern," while phrase structure grammar does not provide this. This relation, of course, is not independent of meaning. To be sure, Chomsky (1957) was not interested in fine distinctions of meaning, since he was drawing attention to broad semantic similarities among sentences.

Chomsky viewed the semantic relation between an active sentence and its corresponding passive as somewhat tenuous. He asserted (p. 101) that "not even the weakest semantic relation (factual equivalence) holds in general between active and passive." This conclusion is based on his interpretation of such sentence pairs as (4), which involve quantifiers (pp. 100-101):

(4) (a) Everyone in the room knows at least two languages.

(b) At least two languages are known by everyone in the room.

He claimed that these two sentences are not equivalent in meaning.

In 1957, then, Chomsky considered the active - passive syntactic relation to be a basic aspect of linguistic structure. However, he viewed the semantic relation between actives and passives to be somewhat more complex; in fact, he felt that if the active - passive relation had been considered basically in terms of synonymity, then the transformational relation would not have come to light (p. 101). In view of such an outlook, it is easy to see why Chomsky looked at meaning similarities only, and hesitated to investigate finer meaning classifications, such as P'-equivalence.

Chomsky's interpretation of semantics is restricted to Sc; he considered kernel sentences to be the "elementary content elements" from which sentences are constructed (p. 108). Further, he avoided specifying the meaning properties of transformations, presumably because of his remarks concerning the passive transformation applied to kernel sentences containing quantifiers (1957, p. 108):

The notion of 'structural meaning' as opposed to

> 'lexical meaning', however, appears to be quite suspect, and it is questionable that the grammatical devices available in language are used consistently enough so that meaning can be assigned to them directly.

Thus, Chomsky viewed the passive transformation as bringing to light an important meaning similarity. Its semantic properties, however, were unclear to him.

Katz and Postal

In attempting to specify the nature of a semantic component for a transformational grammar, Katz and Postal were forced to come to grips with the notion of "structural meaning" which Chomsky had avoided considering. Katz and Postal (1964) suggested that all transformations preserve meaning. This notion was motivated by formal considerations, in order to simplify the nature of the semantic component which they were then proposing. Thus, such transformations as negation and interrogation were reclassified as obligatory transformations, triggered by a marker in the underlying structure.

The sentences "John hit Mary" and "Did John hit Mary?" are thus derived from different underlying structures, the second of which contains the universal morpheme Q. The intuitive relationship between such sentences is reflected in the similarity of their underlying structures, which differ only in the presence or absence of such universal markers as Q, Negative, Passive, and so on. In the Katz-

Postal model (p. 118), underlying structures which differ in morphemes which are particular to given languages, such as *will* or *must*, are not considered to be as closely related syntactically as active-passive or affirmative-negative pairs. Thus, although passive sentences were no longer derived from an active kernel sentence, the intuitive relation between them, which Chomsky was so anxious to capture in his grammar, could still be expressed as a specific type of similarity at the level of their underlying structures.

The distinction between Sc and St is clear in Katz and Postal's description, although they did not state it in these terms. The presence of identical language-specific morphemes in two sentences means that they are Sc-equivalent; however, only if, in addition, they have the same complement of universal markers (same St) can they be considered to be paraphrases. Thus, for Katz and Postal, systematic paraphrase is defined as (Sc + St)-equivalence, here called P^1-equivalence, although the intuitive relationship between sentences which are Sc-equivalent is still reflected in their model. In the Katz-Postal model, passive sentences are not derived from active sentences, but rather from an underlying structure which contains the passive marker in the form of an adverb of manner constituent dominating *by* plus a passive morpheme dummy. Katz and Postal thus regarded active and passive as two different sentence types with distinct underlying structures; as such they do not satisfy the famous Katz-Postal condition for systematic paraphrase (1964, p. 157, emphasis added):

> Given a sentence for which a syntactic derivation is needed; look for simple paraphrases of the sentence which are not paraphrases by virtue of synonymous expressions; on finding them construct grammatical rules that relate the original sentence and its paraphrases in such a way that _each of these sentences has the same sequence of underlying P-markers._

Nonetheless, Katz and Postal, on considering Chomsky's example of passivization of sentences involving quantifiers, concluded that the evidence that passives are not synonymous with their corresponding actives is not convincing. They viewed such sentence pairs as "Everyone in the room knows two languages" and "Two languages are known by everyone in the room" as ambiguous, with both sharing the same two meanings. They asserted (p. 72):

> Thus it seems that both actives and passives containing quantifiers and pronouns are ambiguous in the same way and so are full paraphrases of each other.

They suggested, then, that the difference in the underlying P-markers of an active-passive pair is not semantically significant. This qualification should perhaps be included in their principle of systematic paraphrase. However, they did note that if any convincing evidence appears which indicates that an active and its corresponding passive differ in meaning, then their theory can handle this problem by stating that the differences in the underlying P-markers do have a semantic effect.

Thus, Katz and Postal tried to characterize both the semantic and the syntactic relationships which hold between active-passive sentence pairs. In general, their notion of paraphrase is (Sc + St)-equivalence, but their insistence that active and passive sentences, while being systematic paraphrases, are not St-equivalent, clouds somewhat the boundaries of their paraphrase sets.

Chomsky: Aspects of the Theory of Syntax.

Chomsky (1965) accepted the Katz-Postal principle with enthusiasm, and hinted that it might be a special case of the following general principle (p. 233, n. 3): "'nonstylistic transformations' are all signaled by optional markers drawn from a fixed, universal, language-independent set." He admitted that a much closer analysis of the notion "nonstylistic transformation" was required. The fact that in formulating what has come to be known as the Standard Theory, Chomsky accepted this principle, together with the suggestions as to what markers were necessary in the base (e.g., Q, Negative, Passive, etc.), led to the widespread view that paraphrase sets were those defined by (Sc + St)-equivalence. For example, such a theoretical position was the basis of some experimental work on paraphrase by Gleitman and Gleitman (1970), whose work was done while confidence in both the notions of deep structure and the

Katz-Postal principle was still unshaken.

Chomsky in fact stated in the opening pages of Aspects of the Theory of Syntax, that "the central idea of transformational grammar" is that deep and surface structures are distinct (p. 16). Furthermore, he made it clear that his concern in this book was primarily with deep structure (p. 17). From the point of view of empirical considerations concerning meaning preservation, however, those passages in which Chomsky's concern shifted momentarily to surface structure provide the most interesting reading. Because deep structures, as formulated, are immune to empirical testing, the psycholinguist is limited to assessing the effects of surface structures. Thus, any surface structure consequences of the various claims made about deep structure are of interest. In particular, the surface structure constraints on the sets which the Standard Theory defines as meaning equivalent (P¹-equivalent) are relevant to any experimental work on meaning equivalence.

Within this framework, Chomsky's consideration of passives is one of the most interesting issues in the book. Returning to his earlier example of passivization applied to sentences containing quantifiers, Chomsky again stated that the sentences "Everyone in the room knows at least two languages" and "At least two languages are known by everyone in the room" are not synonymous. He suggested that surface structure considerations -- in this case, the order of quantifiers in the surface structure -- affect the semantic interpretation (p. 224, n. 9). Thus while Chomsky was willing to state (p. 233, n. 3) that "the passive marker ... has no independent semantic interpretation," he did not see a clear semantic equivalence between certain active-passive sentence pairs.

A further interesting observation regarding Chomsky's account of the Standard Theory is that the beginnings of concern with semantics of discourse (Sd) were evident (p. 163), although Chomsky regarded his observations in this area as confusing and inconclusive. He quoted Wilson (1926) on the question of a distinction between the grammatical subject and predicate of a sentence and its psychological subject and predicate. Wilson (1926, p. 119) suggested generally that "the same form of words should be analyzed differently according as the words are the answer to one question or another." A more specific, and very interesting comment of Wilson's (p. 119) is that in the statement "glass is elastic":

> 'glass', which has the stress, is the only word which refers to the supposed new fact in the nature of elasticity, that it is found in glass...[and therefore]...'glass' would have to be the predicate...

Thus, the psychological subject and predicate of a sentence would now be discussed as examples of focus phenomena. This passage is also intriguing because it deals specifically with the grammatical correlates of the semantic notions of new and old information, a subject which has recently been discussed again (Chafe, 1970; see p. 44 below).

Thus, Chomsky (1965) was concerned mainly with the deep structure, distinct from surface structure, which sets the STM apart from earlier structural accounts. However, he raised several issues concerning semantic differences which were clearly surface structure phenomena. These problems, which seem to be unrelated in the Standard Theory, can be grouped together in a theory which includes consideration of focus phenomena.

Recent Linguistic Accounts of Focus

Much of the work in linguistic theory since 1965 has been motivated by an increasing concern with the semantic component of the grammar. An interesting feature of recent publications has been the frequent use of words such as "topic" and "focus." These are theoretical terms which are used to categorize certain kinds of differences in meaning between sentences which were considered in the Standard Theory to be meaning equivalent. The treatment accorded to focus phenomena varies considerably among the recent works published; it depends to a large extent on the particular version of the theory which is espoused, and in turn it has been one of the more influential considerations involved in formulating the theoretical models, particularly regarding the nature of the semantic component.

Interpretive Semantics

That development of the Standard Theory which is known as interpretive semantics, or the Extended Standard Theory, can basically be characterized by its retention of the importance of the deep structure level and its reluctant dismissal of the notion that transformations must be meaning preserving. Consideration of surface structure phenomena such as contrastive stress, and the recognition that such phenomena could influence meaning equivalence, had led to dissatisfaction with the elegant STM. Forced to admit that such surface structure phenomena were semantically significant, Chomsky (1971) defined a notion of surface focus, which was seen essentially as a phonological phenomenon. Chomsky (p. 205) defined focus to be "a phrase containing the intonation centre of the sentence," and (p. 203) referred his readers to Chomsky and Halle (1968) for a discussion of stress rules which, it was assumed, would clarify what was meant by "intonation centre."

An interesting aspect of Chomsky (1971) is his discussion of the dative shift transformation within the framework of surface focus. Thus, the following sentences were considered to be semantically distinct under considerations of focus (p. 203):

(5) (a) Did John give the book to Bill?

(b) Did John give Bill the book?

Respective appropriate responses were deemed to be:

(6) (a) No, to someone else.
(b) No, something else.

It is important to note that the above examples involve normal intonation; contrastive stress is not present. Thus Chomsky suggested that dative movement is semantically significant because it places a different lexical item in the intonation centre of the sentence.

Chomsky introduced the notion of focus to explain why certain constructions, such as dative movement, appear to have semantic significance. His stipulative definition of focus was in terms of normal intonation, which is a surface structure phenomenon. It is important to notice that in defining focus, Chomsky particularly avoided discussion of contrastive stress, which he regarded (p. 205) as involving "grammatical processes of a poorly understood sort." Therefore, his definition of focus was based on normal intonation, which, according to Chomsky and Halle (1968), is at least partially predictable from the surface structure. It is not surprising then that focus, defined in surface structure terms, turns out to be best dealt with as a surface structure phenomenon. This was in fact the conclusion which Chomsky reached, after considering the alternative of focus specified in the deep structure.

Chomsky's discussion of surface focus has been influential. Even those who argue for deep focus are caught up in Chomsky's definition, and continue to think of focus in surface structure terms. This influence is clearly seen in Chambers (1970). In arguing for deep focus, Chambers still thought of focus in terms of the normal intonation centre of the sentence, as is evidenced by his discussion of the dative movement transformation in which he viewed "bringing into focus" as being the same as "back-shifting to the intonation centre."

The basic confusion seems to arise from the fact that focus was introduced to explain semantic differences, but no attempt was made to put focus into a semantic framework. Rather, focus was defined in terms which emphasized its connection with phonological phenomena and de-emphasized its semantic role. Clearly, a definition in terms of the semantic role is to be preferred; correlations with intonation phenomena could then be discussed as interesting points, but would not be the defining characteristics of the term. A semantic framework of the kind discussed earlier in this chapter would be of great value in discussing such notions as focus. Such a framework has recently been proposed, within the interpretive semantics school, by Jackendoff (1972).

Jackendoff proposed that the semantic component of the grammar consists of at least four subcomponents. The first is _functional structure_, which "represents relations in the sentence induced by the verbs, including such notions as agency, motion, and direction [p. 3]." This component corresponds to the Sc discussed earlier. The second component, _modal structure_, is determined "from lexical properties of modal operators and the structural configurations of both deep and surface (or perhaps end-of-cycle) structures [p. 378]"; this corresponds basically to St. Thirdly, a _table of coreference_, to determine which noun phrases are intended to be coreferential, is constructed at the end of each transformational cycle. The fourth component, _focus and presupposition_, is derived from the surface structure, and designates "what information in the sentence is intended to be new and what is intended to be old [p. 3]."

Thus, for Jackendoff, focus is predictable from the surface structure of the sentence, and extra-sentential context is not considered. Jackendoff was strongly influenced by Chomsky's surface focus defined in terms of normal intonation, where focus is determined by predictable elements of the sentence. However, the reason for the surface structure order of the constituents, which in turn determines focus in Chomsky's theory, is what must be investigated if one is to determine whether focus has semantic significance.

Jackendoff's brief treatment of dative movement was limited to a statement of his opinion that (7a) is the underlying form of the following pair (p. 156):

(7) (a) Dave sold a book to Pete.

(b) Dave sold Pete a book.

His argument for this was that the order of complements NP-PP is common in English, while PP-NP and NP-NP are rare. Hence, the base rules resulting in (7a) would be more plausible than those required to give (7b). With this choice of base form, the dative shift transformation must be stated as a front-shifting of the indirect object. Thus, in Jackendoff's model, the dative movement transformation moves the indirect object away from the intonation centre. Jackendoff, however, did not discuss dative shift in terms of focus.

Unfortunately, Jackendoff did not indicate which semantic subcomponent includes passivization. He simply stated that passive does have an effect on the semantic interpretation (p. 106); this indicates that passive must be considered somewhere in the semantic component. Jackendoff did seem to imply that the passive transformation's semantic effect is characterized by a reassignment of the focus of the sentence. This is part of his broader argument (p. 235) that "choices of focus correspond to constituency in surface structure, not deep structure." For example, sentence (8) can have (9) as a possible answer:

(8) Was "The Sound Pattern of English" reviewed by the New York Times?

(9) No, it was made into a movie.

This answer, however, corresponds to the focus "(was) reviewed by the New York Times." Thus, constituents which can be focused include some which are not deep structure constituents, but rather derived structure constituents created by the passive transformation.

Another feature of Jackendoff's book which has some bearing on the passive transformation is his discussion of thematic relations based on Gruber's work. The five thematic relations which Jackendoff discussed are theme, location, source, goal, and agent. Of these, theme is the most basic notion; "in every sentence there is a noun phrase functioning as Theme [p. 39]." These are semantically defined concepts which are determined at the level of deep structure, and therefore belong to that aspect of semantic representation which Jackendoff has called functional structure, similar to semantics of content (Sc). Thematic relations, then, appear to be similar to Fillmore's case relations (1968). An important difference though is that a single underlying noun phrase can function in more than one thematic relation. For example (p. 34), Max in one reading of the following sentence functions both as theme (the NP undergoing the motion in a sentence involving a verb of motion) and as agent:

(10) Max rolled down the hill.

Jackendoff argued (p. 34) that case grammar, in which each noun phrase has only one deep structure case, can express all the relevant semantic information for sentences such as (10) only in a complicated way. Therefore, Jackendoff preferred Gruber's system of thematic relations to Fillmore's case grammar.

One advantage of adopting the notion of thematic relations is an interesting constraint on passivization which is possible in this system. A condition which seems to hold on passivization is this (1972, p. 43):

> _Thematic Hierarchy Condition_
> The passive _by_-phrase must be higher on the Thematic Hierarchy than the derived subject.

The following hierarchy is proposed:

The Thematic Hierarchy
1. Agent
2. Location, Source, Goal
3. Theme

Thus Jackendoff specified a direct dependence of passivization on functional structure (Sc). His view, then, was that application of the passive transformation depends on the functional structure (Sc) of the sentence and that, once applied, it has the effect of reassigning the focus of the sentence. To summarize his use of the terms, _theme_ is a semantics of content notion, and _focus_ is a phonological, surface structure phenomenon. Jackendoff's use of the term "theme" thus contrasts with Halliday's account, where "theme" is a discourse phenomenon.

Generative Semantics

Generative semantics is a development of the Standard Theory which retains the Katz-Postal principle that transformations preserve meaning. Consistent acceptance of this principle, however, has required that more abstract underlying structures than the Standard Theory "deep structure" be postulated. The generative semanticists claimed that these abstract structures are closer to the underlying semantic structure.

Lakoff (1971, p. 283) described the generative semantics treatment of such constructions as question and imperative in underlying structures as the "natural syntax" position, which is that "the 'deep structure' phrase-marker of the sentence contains the semantic representation corresponding to the construction directly." In contrasting his treatment of such phenomena with that of interpretive semantics, he dubbed the latter's framework "arbitrary syntax." Lakoff (p. 283) made the following comment about the interpretive semantics treatment of constructions such as the imperative or question:

> ..the deep structure corresponding to a construction of the sort described _never_ contains the phrase-structure configuration of the meaning of the sentence directly. Instead, the deep structure corresponding to the configuration must contain some arbitrary marker.

Lakoff's further discussion of this topic shows that he considered such "arbitrary markers" to be poorly motivated. However, Partee (1971, p. 6) has pointed out that all such markers discussed by Katz and Postal (1964) were independently motivated.

The generative semantics position, then, does not distinguish its treatment of St phenomena from that of Sc phenomena. Both are represented "directly" and abstractly in the underlying structure. The further suggestion that Sc, as defined here, does not hold a basic position with respect to meaning equivalence is evident in many publications by generative semanticists. For example, Postal (1971) insisted that the surface verb "remind" does not occur in the underlying structure, but rather is derived by way of "the strike-like analysis." Since the underlying lexical items strike and like (or strike and resemble) can occur in the surface structure, unaltered by the optional remind-formation transformation, the following sentences have the same deep structure in Postal's analysis (1971, p. 235):

(11) Max reminded me of Peter.

(12) Max struck me as resembling Peter.

According to generative semanticists, then, transformations preserve meaning, but they do not necessarily preserve lexical items (Postal, 1971, p. 245):

> In general, those structures which provide the input to transformational rules are not defined even in part by a relation to surface structures which is "lexical item preserving".

Thus, in the generative semantics framework, sentences which are paraphrases are not necessarily Sc-equivalent, if Sc-equivalence is defined, as by Fletcher (1973, p. 14), to include "sameness of lexical items."

This observation is correctly interpreted by Fletcher (1973, p. 42) as a relaxation of the STM constraints on meaning equivalence. One might gain the mistaken impression of an overall weakening of the constraints on meaning equivalence if one considers generative semantics within the framework of semantic distinctions discussed earlier in this chapter, since Sc-equivalence is assumed in this framework to be somehow more basic than other types of meaning equivalence. However, it seems that generative semantics does not easily fit this semantics framework; lexical items and their functional relationships are treated as no more basic than are modal constructions (such as question) in the underlying structures of generative semantics.

It seems to be inaccurate to suggest that in the generative semantics position, the constraints on meaning equivalence have been relaxed. Rather, within the semantics framework discussed above, the constraints on meaning equivalence have simply shifted from those of the STM. In fact, generative semanticists give considerably more attention to the importance of Sd-equivalence than did linguists who worked within the Aspects model.

Lakoff (1971, p. 234), in discussing the generative semantics theory, which he called the basic theory, proposed the following semantic structure for the grammar:

> Given a syntactic structure (P(1),...P(n)) we define the semantic representation SR of a sentence as SR= (P(1),PR,Top,F,...), where PR is a conjunction of presuppositions, Top is an indication of the 'topic' of the sentence, and F is the indication of the focus of the sentence.

He further suggested that Halliday's notion of focus, which was adopted by Chomsky, can be handled naturally within the basic theory. Lakoff claimed that such a notion of information focus can be approached by means of a global derivational constraint which states the correspondence between the elements PR and F of the semantic representation, and the corresponding surface constituents.

Lakoff pointed out two problems with Chomsky's treatment of focus as a surface-structure phenomenon. First, he questioned the validity of assuming that the item which receives main stress must be considered to provide new rather than presupposed information. His example (p. 261) is:

(13) The TALL girl left.

Lakoff suggested that here "the semantic content of the focus is an assertion of coreferentiality," namely that "the new information is that the girl who was presupposed to have left is coreferential with the girl who was presupposed to be tall."

Secondly, Lakoff questioned Chomsky's assumption that focus can be accounted for in terms of surface structure constituents. He considered the following sentences, which have different surface structure constituents (p. 262):

(14) (a) John looked up a girl who he had once met in Chicago.

(b) John looked a girl up who he had once met in Chicago.

Lakoff claimed that these sentences do not differ in focus possibilities and their corresponding presuppositions. He also stated that Chomsky would predict such differences, since, in his model, focus is determined by the surface structure.

Both these arguments suggest that Chomsky's treatment of focus is inadequate, but Lakoff has provided only a sketchy account of an alternative treatment. Lakoff's comments about focus, then, serve to further the impression that this is an area of linguistics which needs considerable work.

Lakoff, in discussing "topic," again gave no clear indication of why such a notion is required in his theory. Again he assumed that it is well enough motivated by previous work outside generative semantics, and he stated simply that "topic" can be handled naturally in the basic theory. Again he proposed that "topic" be handled by a global derivational constraint linking transformations and presuppositions. He also suggested (p. 263) that the following generalization might hold: "that surface subjects in some class of sentences are always topics." This is a somewhat odd general statement to make, following as it does the attack on Chomsky's position that surface structure seems to be closely related to focus. This is particularly so since Lakoff believed that "the notion 'topic' may well turn out to be a special case of presupposition [p. 263]," and he had just indicated in discussing sentences (14) that there is no simple dependence of presupposition on surface structure.

The only clear conclusion to be drawn from Lakoff's discussion of topic and focus, then, is that while Sd is seen as being relevant to an adequate linguistic theory, the treatment of Sd is as yet in an early stage. On the one hand, Lakoff's arguments suggest that Chomsky's relatively concrete description may be inadequate; on the other hand, Lakoff has not yet presented a proposal which is explicit enough to be evaluated.

Another Semanticist View: Chafe

Chafe belongs to neither the interpretive semantics nor the generative semantics school. He described his own view as "semanticist", while he viewed that of the interpretive semanticists as "syntacticist" (Chafe, 1970, p. 64). Starting from the theme that language is a system for converting meaning into sound, Chafe described his model of language as having the following components (1970, p. 55):

> First, there are processes of "formation" by which a semantic structure is constructed at the outset. Second, there are processes of "transformation" by which a semantic structure is modified to become a surface structure, and by which, as well, an underlying phonological representation is converted into a phonetic one. And, third, there are processes of "symbolization" by which postsemantic units of a surface representation are replaced by underlying phonological configurations.

Although Chafe (1970, 1971) did not describe himself as a transformationalist, his model, like the others discussed here, does include a component which transforms semantic structures into surface structures. Chafe (1970) did not indicate his opinion of the generative semantics position, or of its relation to his semanticist views. He did, however, share their concern with "the basic role played by semantic structure in the structure of language [p. 210]."

Chafe's position, then, is that "at the heart of an adequate theory of language must be an adequate theory of semantic structure [p. 11]." A second theme throughout the book is his attempt to "identify certain noun-verb relations [such as _patient_, _agent_, _beneficiary_] as forming the backbone of semantic structure [p. 10]." In investigating semantic structure, Chafe made a distinction between the elements of a sentence which convey old information and those which convey new information. He argued that this distinction is motivated semantically, and is also reflected in postsemantic consequences, both syntactic and phonological.

Chafe discussed several of his ideas regarding old and new information, but his presentation is inadequate in that he failed to back up any of his specific claims with empirical evidence. His first assumption (p. 214) is that "there is one 'least-marked' distribution of old and new information in a sentence [p. 214]." An example of such a sentence (p. 215) is:

(15) Lisa received a present.

In this sentence, the first syllable of present has the strongest stress and highest pitch in the sentence; the underlining indicates this. The noun root present and also the verb root receive are seen as conveying new information. Chafe insisted (p. 216) that "high pitch is indeed a surface reflection of the semantic presence of new," although if he was correct about the verb root always conveying new information, while not receiving higher pitch, it is clear that the relation is not a simple correspondence.

Chafe next considered sentences with an indirect object (p. 217):

(16) David gave Lisa a picture.

His claim is that the verb root, the patient noun root picture, and the beneficiary noun root Lisa all convey new information if the sentence is unmarked with respect to the distribution of old and new information. A general statement of Chafe's remarks concerning the distribution of old and new information in sentences (15) and (16) is the following hierarchy for active sentences: agent is always old information; beneficiary is old if it occurs without an agent; patient is old if it occurs without an agent or beneficiary; location is never old, because it never occurs without a patient.

Chafe noted that if such a distribution of new and old information is inappropriate in a given context, the distribution can be changed by specifying the verb as passive. In Chafe's model, then, one function of the passive inflection is to alter the above order of priorities for the distribution of new information. One result is that "the agent noun root of a passive verb normally conveys new information [p. 221]." Thus, in (17) below, the beneficiary conveys old information, while the patient and agent noun roots convey new information (p. 221):

(17) Lisa was given the picture by David.

This is an interesting remark about the underlying reasons for passivization in "unmarked" situations, but unfortunately it is confounded by reference to a poorly motivated definition of the "unmarked" distribution of old and new information. Chafe did not explain why, for example, sentence (17) is more basic than (18) below:

(18) Lisa was given the picture by David.

Sentences (17) and (18) answer the questions (19) and (20) respectively (p. 220):

(19) Why is Lisa so excited?

(20) Who gave Lisa the picture?

However, Chafe gave no indication of a reason for his apparently arbitrary choice of considering questions like (19) to be basic.

Because such properties as amplitude and pitch are basic to Chafe's discussion about focus, his ideas are somewhat similar to the intonation centre view of focus adopted by the interpretive semanticists. However, in Chafe's theory, the emphasis is on the semantic reasons behind the increase in pitch and amplitude which characterize focus; such changes are "related to an increase in the effectiveness of communication [p. 213]."

Chafe, then, considered passivization to be semantically significant. Dative movement, on the other hand, has no simple semantic correlates in his theory. Sentence (21) below contains, in the unmarked case, the same distribution of old and new information as does sentence

(16):

(21) David gave a picture to Lisa.

However, in Chafe's model, dative movement results in a difference in information distribution for sentences in which the verb is specified as passive (p. 221):

(22) (a) The picture was given to Lisa by David.
(b) Lisa was given the picture by David.

In Chafe's theory, the semantic significance of dative movement in a given sentence depends on the presence of the passive inflection in the verb. In terms of the Standard Theory, then, Chafe would predict that dative movement is semantically significant only when it occurs in conjunction with passivization. This prediction might be altered if Chafe were to distinguish various types of "new information."

Revised STM: Chambers

One further theoretical account of syntactic focus devices which deserves attention is that of Chambers (1970). Unlike Chafe's treatment of focus, which was motivated semantically within his own framework, Chambers' treatment was largely motivated by syntactic considerations. Chambers' overall purpose was to attempt to revive the Standard Theory by proposing a deep structure account of those semantically significant phenomena which can be described as focus devices. Chomsky (1971) felt that such a treatment would run the risk of being arbitrary, and of robbing the Katz-Postal principle of its empirical content. Nonetheless, Chambers felt that "deep focus," as he called it, would be useful in refining the notion of "stylistic variants," which he considered to comprise far too large a class of syntactic phenomena. In the terms presented earlier here, Chambers was interested in dividing (Sc+St) - equivalent classes into their (Sc+St+Sd) - equivalent subclasses. In part, this interest was motivated by psycholinguistic experiments, such as that of Tannenbaum and Williams (1968), which had supported the notion that active and passive sentences are not merely stylistic variants; the choice between them is motivated by the speaker's focus of attention.

Chambers proposed (p. 24) that "a feature [±FOCUS] be assigned by a very general rule of the base component to the matrices of categories at the level of deep structure." Passive sentences, then, would be focus variants of their corresponding active forms; this semantically significant distinction would be marked at the deep structure level. This is certainly an improvement over the contradictory stance adopted by Katz and Postal (1964), who opted for a passive marker in the deep structure, but felt nonetheless that an active sentence and its corresponding passive were meaning-equivalent.

Chambers thus proposed Rule 2 as an approximate version (p. 56) of the passive rule, suggesting that it should replace Rule 1, Chomsky's original formulation (Chambers, 1970, p. 47):

Rule 1. PSV (optional)

SD:	NP	AUX	V	NP	
SC:	1	2	3	4	-->
	4	2+ *be* + *en*	3	*by* +1	

Rule 2. PSV (obligatory)

SD:	NP	AUX	V	[NP] [+FOCUS]	
SC:	1	2	3	4	-->
	4	2+ *be* + *en*	3	*by* +1	

Similarly, Chambers' tentative revision of dative movement is as follows (p. 60):

Rule 3. DATIVE (obligatory)

SD:	V	[NP] [+FOCUS]	NP	
SC:	1	2	3	-->
	1	Ø	3+P+2	

In Chambers' analysis, both obligatory rules are sensitive to the same feature specified in the deep structure. Thus, Chambers claimed (p. 65) that structure (23) below will result in (24) (with (25) blocked) if PSV is ordered before DATIVE, and (25) (with (24) blocked) if the ordering is reversed:

(23) Swift sent [Stella] a note.
                [+FOCUS]

(24) Stella was sent a note by Swift.

(25) Swift sent a note to Stella.

In order to get around this problem, Chambers proposed a formal distinction between the [+FOCUS] specification which results in passivization, and that which results in dative movement. He suggested the feature [+TOPIC] to trigger those permutations which prepose constituents, while [+FOCUS] would then trigger only the transformations which postpose constituents to the intonation centre.

Actually, however, applying Chambers' rules in the case that PSV is ordered before DATIVE does not result in (24), but rather (26):

(26) Stella was sent by Swift a note.

Chambers' rules, as stated, do not allow (24) to be derived; similarly, (27) is blocked:

(27) A note was sent to Stella by Swift.

Therefore, Chambers' statement of PSV is inadequate for dative sentences.

This, then, is a summary of Chambers' proposal for deep focus. He claimed that his model has several advantages over the surface focus model which Chomsky (1971) had proposed. First, Chambers suggested that "the equivalence of focus and intonation which is at the heart of the notion of surface focus [pp. 32-33]" is undesirable. He claimed that there is only one intonation centre in each sentence; therefore, a theory adopting surface focus cannot deal with sentences, such as (28) (Chambers, 1970, p. 33), which have more than one occurrence of focus:

(28) MARIE gave the bird to CLYDE.

However, it is difficult to see how Chambers' model is an improvement over the surface focus model with regard to this problem. Neither theory makes the claim that contrastive stress cannot produce more than one focused item in a sentence. Both Chomsky's and Chambers' theories adopt a one-to-one correspondence between focus and intonation centre. However, both theories provide an awkward framework for discussung contrastive stress (see Chapter Three).

That Chambers did consider focus to be related to the surface structure phenomenon of intonation centre, and that he, like Chomsky, based his development of focus on sentences with normal intonation, is clearly indicated in such statements as these (Chambers, pp. 25-26):

> Transformational rules which are sensitive to the feature [+FOCUS] turn out to involve primarily reordering of two sorts. The first preposes focused constituents to the subject noun phrase (NP) position in the surface structure, as in passivization. The other shifts focused constituents to the intonation centre of the sentence, as in dative movement and clefting.

Thus not only does Chambers' notion of deep focus have strong surface structure correlates, but also surface structure phenomena strongly motivated the theoretical development. In this regard, Chambers' treatment of dative movement is particularly interesting. It is clear from his statement of the DATIVE transformation (p. 60) that he considered the underlying structures to be those like (29a), while dative movement operates, if the indirect object is marked [+FOCUS], to produce sentences like (29b):

(29) (a) John gave Andrew the book.
(b) John gave the book to Andrew.

The only motivation for choosing (29a) as the underlying structure comes from surface focus considerations -- namely that focus and intonation centre coincide, and that intonation centre is determined by the stress rules mentioned in Chomsky and Halle (1968). Thus, Chambers' notion of deep focus appears to be motivated by surface structure considerations, as was Chomsky's notion of surface focus. The question arises, then, as to whether Chambers' improvements could be made within the framework of surface focus.

Chambers' second objection to surface focus is that the notion of "phrase containing the intonation centre" is an equivocal one, and hence is not useful in determining the focus. This may be a problem for Chomsky's theory, but it is not one which is solved by Chambers' proposals. Chambers claimed that the following sentence (p. 34), under normal intonation, potentially has at least five focused phrases, as indicated by the parentheses:

(30) (^{1}did (^{2}Marie (^{3}give (^{4}the bird (^{5}to Clyde^5) ^{4}) ^{3}) ^{2}) ^{1}).

This consideration causes Chambers' analysis some difficulty, since his primary motivation for the split between [+TOPIC] and [+FOCUS] specifications was that the latter trigger transformations which bring constituents into focus by postposing to the intonation centre. However, if a focused item can be any phrase containing the intonation centre, then the focusing property of postposing is somewhat less convincing.

It is not even clear that this "multiplicity of surface focus [p. 35]" is necessarily a weak point of Chomsky's theory. It suggests that discourse analysis may be necessary in order to determine such phenomena as focus.

Chambers' third objection to surface focus is Lakoff's point, mentioned earlier, that some sentences which have distinct surface structure constituents appear not to have different focus possibilities. The particular example which Lakoff gave ((14), p. 43 above) involves particle movement. Chambers agreed with Lakoff that the focus possibilities of the two sentences are identical "since the contrast in surface constituent structures in [(14a)] and [(14b)] is merely the result of particle movement [p. 38]." However, Chambers did not back up this claim that particle movement is semantically insignificant; therefore, his statement is unwarranted. Jackendoff (1972, p. 22, n. 2) in fact has suggested that sentences (14a) and (14b) do differ in focus possibilities, since the phrase "a girl whom he had once met in Chicago" is a constituent in (14a) but not in (14b):

> Thus the theory predicts that [(14a)] should be a more natural answer than [(14b)] to _Whom_ _did_ _John_ _look_ _up_? Insofar as my intuitions are applicable to this example, this prediction seems correct.

This argument may appear to be much weaker than that of Chambers. Both arguments, however, are based on intuitions. Jackendoff's intuitions in this matter are about individual sentences; Chambers' are about the general phenomenon of particle movement. It is to be hoped that experimental work will soon answer questions such as this, and put an end to the all-too-frequent publication of intuition-based arguments and counter-arguments for particular sample utterances.

The fourth objection which Chambers voiced against surface focus is that this model creates theoretical chaos by forcing abandonment of the Katz-Postal principle. This criticism is difficult to evaluate; it is not now so clear as it once seemed to be that a theory which allows the Katz-Postal principle is superior to a theory, accounting for similar phenomena, which forces the abandonment of this principle. Assessing the strength of Chambers' argument would involve an assessment of the relative merit of the Standard Theory Model and all the models which have been proposed as alternatives, not only with respect to the question of focus phenomena, but several other issues as well. Such an assessment is beyond the scope of the present study.

Chambers' final objection to surface focus was that it does not allow for a sentence to have no focused item, because the "least-marked" case in a surface focus interpretation is for everything to be in focus. That is, if no particular phrase is in focus, and if focus is defined to be a phrase containing the intonation centre, then the whole sentence must be in focus. This is also Halliday's view (p. 208); namely, "where the focus is unmarked,...its domain may be the whole of the information unit." However, in Chambers' theory, the assumption is made (p. 41) that some sentences in fact have no focused item:

> ...deep focus assumes that for those deep structures which are ultimately transformed into declarative surface structures with normal intonation, focus is not a consideration in the semantic interpretation.

The surface focus view, then, is that every sentence with unmarked focus has a reading in which the whole sentence is focused. Chambers' objection to this view (p. 41) is based on the "corollary assumption" that for such a reading, "nothing is presupposed." His argument, however, is based on the general notion of presupposition of existence, which appears to be far removed from any reasonable linguistic interpretation of the presupposition - focus framework. The term "presupposition" should perhaps be replaced, since it is often interpreted in the sense that "...the presuppositions of a sentence are those conditions that the world must meet in order for the sentence to make literal sense." This view of presupposition, expressed by Keenan (1971, p. 45), seems to be relatively independent of focus considerations. A better pair of terms than "presupposition - focus" would be Halliday's "given - new" information framework (1967, p. 204), where new information is new "in the sense that the speaker presents it as not being recoverable from the preceding discourse." Thus, Halliday asserted (p. 208) that a sentence with unmarked focus, in which the whole information unit may be in focus "...does not imply any preceding information, and this is in fact the form appropriate to the first information unit in a discourse." In linguistic theory, focus is considered to be a discourse phenomenon, but the use of the term "presupposition" has sometimes led to considerations beyond the level of a particular discourse.

The extent, then, to which Chambers' notion of deep focus is an improvement over surface focus cannot be assessed without addressing the following issues. First, Chomsky would claim that such a deep focus theory is merely a notational variant of surface focus (1971, p. 206).

Jackendoff (1972) would qualify this claim by noting its dependence on the assumption that transformations cannot introduce new nodes (p. 240), which he regarded as an open question. Secondly, in Chomsky's model, the focused constituent cannot always be determined from an isolated sentence, because of the imprecision of the notion of "phrase containing the intonation centre." In Chambers' model, the focused constituent of any isolated sentence is clearly defined without reference to the context; whether this represents an improvement is unclear. Further, in his theory, sentences with unmarked focus have no focused (new) items; the motivation for this change from Chomsky's or Halliday's theory, however, is based on an argument concerning presupposition of existence. Chambers further claimed that his model, but not Chomsky's, would account for those sentences in which two or more constituents are focused. Since such sentences generally involve instances of contrastive stress, this claim will be discussed in the following chapter.

CHAPTER THREE

CONTRASTIVE STRESS

Theoretical Treatment of Contrastive Stress

Within theories of transformational grammar, contrastive stress is usually treated as a phonological process, as are the phenomena of normal stress and intonation. Various arguments have been advanced for either a syntactic or a semantic component of contrastive stress. In particular, the semantic aspects of contrastive stress are of interest here. The serious attempts to incorporate a model for contrastive stress into a transformational theory of grammar have been recent. Three of these accounts -- Chambers (1970), Chafe (1970), and Jackendoff (1972) -- will be discussed here. Some of the earlier accounts of contrastive stress are first provided as background.

In *Syntactic Structures*, Chomsky (1957, p. 65) discussed briefly the "heavy-stressed" auxiliary verb in such sentences as "John *does* come." He suggested that such sentences are transformationally derived from kernel sentences, such as "John comes," by a transformation of "affirmation." This is the only kind of stress which Chomsky dealt with in *Syntactic Structures*. It is not surprising that this type of construction was the one which he happened to mention, because this kind of stress is predictable from the surface structure, while other kinds are not. In Chomsky (1971), contrastive stress was discussed, although it was seen as involving "special grammatical processes of a poorly understood sort [p. 199]," which result in a shift in the intonation centre of the sentence. Chomsky considered this shift to be semantically significant, and perhaps of syntactic significance also. He suggested (p. 204) that the focus and presupposition in sentences with contrastive stress are determined from the intonation centre, as they are in sentences with normal intonation.

Another characterization of contrastive stress concerns the work of Gleitman (1965) and Sanders (1968). In an informal discussion of contrastive stress, Sanders claimed that stress has greater significance than does the ordering of constituents in a discourse. For example (pp. 55-56), he considered question (1a) to be answered appropriately by (1b), but not by (1c), which preserves the constituent order of the question. Heavy stress is indicated by underlining:

(1) (a) Which boy (who is) standing in the corner is your brother?

(b) The boy (who is) wearing a dunce-cap (who is) standing in the corner is my brother.

(c) The boy (who is) standing in the corner (who is) wearing a dunce-cap is my brother.

From examples such as these, he concluded (p. 156, emphasis added):

> ...certain stressing laws, at least, have nothing whatever to do with superficial, or phonological, structures, and are probably universally defined for all languages simply in respect to the identity and non-identity of sub-strings of semantic and syntactic elements within the same discourse string. _The basic process here is simply the assignment of stress to the non-identical constituents of a pair of otherwise identical structures._

Sanders credited Gleitman (1965) with providing some necessary background discussion for the informal rule above. In a paper about conjunctions in English, Gleitman (p. 270) concluded that "stress is related to repetition." Sanders claimed that his stress rule (1968, p. 158) is a generalization of Gleitman's rule, and that it is simplified by the assumption that "sentential constituent ordering is logically subsequent to stressing." He argued (p. 159) that the simplified stress rule that he thereby obtained reflects:

> ...our intuitive understanding of linear order as something which is semantically irrelevant and as something which is imposed on sets of superficial constituents of sentences according to different and equally arbitrary rules for different languages.

For Sanders, then, transformations such as passivization and dative movement are semantically empty, while contrastive stress is significant. Secondly, he argued from his informal stress rule that contrastive stress can be considered as a syntactic process. Actual attempts to express contrastive stress as a syntactic process, however, have been unconvincing (see below).

A more thorough treatment of contrastive stress is provided by Bolinger (1961, 1972). He made a distinction between contrastive accent and contrastive stress. Bolinger argued (1972, p. 633) that accent is independent of syntax, "directly reflecting the speaker's intent and only indirectly the syntax." Further, "accented words are points of information focus." Bolinger also emphasized the pitch component of accent. Contrastive stress, on the other hand, was seen (1961, pp. 116-17) as being "phonetically definable as a shift in stress, although one cannot predict with precision when, where, and how the shift will occur."

For Bolinger, then, contrastive stress is a shift of stress within a word for the purpose of contrasting that word with another phonetically similar one in the same utterance. The contrast is usually an explicit one, with both words appearing in the utterance. Thus, in (2) below, there is no contrastive stress. The words "report" and "broadcast," although they are spoken with increased pitch and volume, are normally stressed[1] (p. 107):

(2) I said to report the trouble, not broadcast it.

For Bolinger, contrastive stress occurs when such pairs of words as "*ex*port" and "*de*port", or "*ho*tel" and "*mo*tel" are spoken, usually in the same utterance. Bolinger does allow that in some cases this shift in stress may occur when only one member of the pair is spoken. An example would be the utterance, "I'd advise a *mo*tel in this city." In such situations, "the speaker has the opposite member at the back of his mind [1961, p. 108]."

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[1] Bolinger represented pitch by vertical displacement. Here, however, the accented syllables are underlined.

Contrastive accent, in Bolinger's discussions, seems to be defined as any intonation pattern which brings out a contrast between two syntactically similar constituents in a discourse. Two points are worthy of note here. First, contrastive accent may occur in utterances which have normal intonation. Secondly, the contrast is again an explicit one; usually both of the similar constituents must be present. Thus, for (2) above, Bolinger claimed that "report" and "broadcast" are contrastively accented.

The lack of clarity in Bolinger's definition of contrastive accent is illustrated by his comments regarding the following sample discourse (1961, p. 106):

(3) (a) I found a *book*.
(b) *Whose* book?
(c) *John's* book.
(d) Not *Joe's*?

His remark was this:

> ...there is no difference between *whose*, *John's*, and

> Joe's as far as accent or reasons for accent are concerned, but we are likely to limit the term contrastive to the word Joe's in the last sentence of the series.

Bolinger, then, did not view utterances as predictably containing either contrastive or non-contrastive accent, but rather as "more likely" or "less likely" to contain contrastive accent. In (3) above, he viewed (3d) as containing contrastive accent; here the intonation is normal, and both the contrasted items have been mentioned explicitly in the discourse.

Recently, Bolinger has suggested that, while accent is not in general predictable, clear tendencies toward certain intonation contours are sometimes found. This opinion surfaced in his reply (1972) to a suggestion by Bresnan (1972). She had proposed (1972, p. 340) that the questions (4) and (5) below can be distinguished in the following way. Sentence (4) occurs as the opening of a discourse; (5), however, requires a prior context such as "We should take one of these turns," and is used "to elicit latent or withheld information":

(4) Which turn should we take?

(5) Which turn should we take?

Bolinger regarded this distinction between initiatory and elicitory questions to be poorly motivated, and stated (p. 642) that "what is involved is the de-accenting of repeated elements and the accenting of new elements, which is to be found everywhere."

This remark of Bolinger's is similar to the rule proposed by Gleitman (1965) and Sanders (1968). However, both Gleitman and Sanders tried to account for accent directly in terms of syntax, and their rule is intended to be exceptionless. Bolinger, on the other hand, observed (p. 644) that only tendencies toward certain stress patterns could be discussed in terms of syntax:

> The distribution of sentence accents is not determined by syntactic structure but by semantic and emotional highlighting. Syntax is relevant indirectly in that some structures are more likely to be highlighted than others. But a description along these lines can only be in statistical terms.

According to Bolinger, if the partly identical structures are phonetically similar words, then the stressing of the non-identical parts is considerably more likely than is the accenting of non-identical parts when the partly identical structures are semantically similar words, or larger constituents. In the latter case, there are more possibilities for the intonation pattern, with the result that each choice has a lower probability of occurring.

The distinction between contrastive stress and contrastive accent will not in general be maintained in the following discussion, since the TGG theories use the term "contrastive stress" in both senses. However, in the present experiment, which is introduced in Chapter Five, the use of "contrastive stress" is restricted to Bolinger's notion of contrastive accent. The stress variants in the experiment thus reflect semantic highlighting. Contrastive stress, when it is regarded as phonologically distinct from normal stress, will be represented by capitalization throughout the remainder of the discussion.

Bresnan's (1972) views on stress and syntax deserve some mention; it was mainly her proposals concerning the Nuclear Stress Rule of Chomsky and Halle (1968) that caused Bolinger to complain about current attempts to account for accent in terms of syntax. She summarized her position (p. 341) by stating that:

> ...because elicitory questions [e.g.(4b) above] depend upon special non-grammatical contexts, they are a counter-example to any purely grammatical theory. This is also true of contrastive and emphatic intonation (e.g.,This IS my answer; He wasn't REjected; he was DEjected.) The most reasonable conclusion is not that a structural theory of intonation is impossible, but that it must be restricted to those phenomena which are indeed structure-dependent.

For Bresnan, then, "grammar" is limited to syntax. The "non-grammatical contexts" which she mentioned are discourse phenomena, which, as discussed in Chapter Two, are an important consideration in the theories of grammar of Jackendoff and Chafe, and are mentioned by Lakoff. She is correct if, by her first statement quoted above, she meant that a formal syntactic treatment of discourse phenomena, such as that undertaken by Chambers, has been elusive. She is probably quite right, too, in being wary of a formal syntactic treatment of contrastive stress.

Attempts to incorporate contrastive stress into the syntactic component of a grammar have not been satisfactory. In the following two sections, the contributions of Chambers (1970) and Jackendoff (1972) will be discussed. This is followed by a discussion of Chafe's account of contrastive stress within his theoretical model.

A Deep Structure Approach: Chambers

On intuitive grounds, Chambers (1970) stated that contrastive stress places more emphasis on constituents than does either passivization or dative movement. He emphasized the syntactic aspects of contrastive stress; citing an article by Fischer, who provided syntactic evidence for relating cleft sentences and contrastive stress, Chambers treated the two processes as being related, and called them both hyperfocus devices.

Chambers proposed that a marker be present in the deep structure which would, like the markers for passivization and dative movement, trigger an obligatory rule (p. 125):

> ...I consider the hyperfocus devices to be triggered by a set of features which always includes [+FOCUS] or [+TOPIC] as one member. The additional, or hyperfocus, feature is arbitrarily written as [+FILL].

This proposal appears to have been made with only dislocations and cleft sentences in mind. Chambers went on to describe how all the cleft structures and dislocations can be derived by various combinations of [+TOPIC],

[+FOCUS], and [+FILL]. He did not provide a similar discussion for contrastive stress. There are several problems with the analysis; for example, Chambers' attempts to integrate his treatment of contrastive stress with his proposals for dative movement were inadequate.

The dative movement rule, as stated by Chambers (p. 56), transforms (6a) into (6b) below:

(6) (a) The farmer gave John a Clydesdale.
    (b) The farmer gave a Clydesdale to John.

There is no provision in Chambers' model for contrastively stressing the direct object, because this noun phrase is never specified as [+FOCUS] or [+TOPIC]. Thus, (7) below is not accounted for:

(7) The farmer gave John a CLYDESDALE.

Secondly, since dative movement is obligatory in Chambers' analysis, it will either always be triggered or always not be triggered by the features [+FOCUS, +FILL] on the NP John in (6a) above. If it is triggered, then it is not clear how to produce sentence (8) since, in order to receive contrastive stress, John must be specified [+FOCUS].

(8) The farmer gave JOHN a Clydesdale.

Similarly, if dative movement is not triggered by [+FOCUS, +FILL], then the derivation of (9) is unclear:

(9) The farmer gave a Clydesdale to JOHN.

In Chambers' model, then, contrastive stress is not successfully likened to clefting. Further, no suitable treatment is given for contrastive stress. Chambers' claim, mentioned in an earlier section, that his model will account for sentences that have more than one focused item, is based on his inadequate discussion of contrastive stress.

Emphasizing the syntactic aspect of contrastive stress appears not to have been successful in general. Chambers discussed two other such attempts, one of them from an unpublished paper. The present discussion is based on Chambers' accounts of the proposals. The unpublished proposal, due to Fischer, is that "contrastive stress and cleft sentences are two surface structure reflections of the same deep structure fact [Chambers, 1970, p. 128]." The evidence to support this proposal consisted of Fischer's intuitive observation that both contrastive stress and clefting limit the scope of negation, questions, and movable adverbs. Regarding the scope of questions, Chambers argued that (10) and (11) below share the presupposition that John's daughter has a new bike; both question only whether it was John who bought it (p. 127):

(10) Did JOHN buy a new bike for his daughter?

(11) Was it John who bought a new bike for his daughter?

This intuition-based argument is unclear.

Chambers (p. 147) discussed a second proposal, due to Saltarelli, that contrastive stress be derived "as a syntactic process from underlying propositions and their complements." According to Chambers, (12a) is derived from (12b):

(12) (a) Haj is too BIG to climb over.

(b) Haj is too big to climb over something, not Haj is too big for something to climb over.

In Saltarelli's proposal (1970, pp. 243-44), however, only the simple sentence "John built the house," and its stress variants, were discussed. Thus, he did not mention complement structures such as the one in (12b). One problem with Saltarelli's proposal, then, is that he did not state any constraints on the structures which can be invoked as complements. It is not clear that the complements in (12b) and (13b) are useful.

Chambers believed that (12a) is semantically distinct from (13a) which he saw as being derived from (13b):

(13) (a) Haj is too big to CLIMB over.

(b) Haj is too big for something to climb over, not Haj is too big to climb over something.

Presumably, then, (14a) is grammatical according to Chambers' interpretation of Saltarelli's proposal, but (14b) is ungrammatical:

(14) (a) Mount Rundle is too big to CLIMB over.

(b) Mount Rundle is too BIG to climb over.

The semantic distinction which Chambers proposed is unclear. The main insight of Saltarelli's proposal, then, is that contrastive stress provides "implicit affirmations of some alternative [Chambers, p. 148]." The problem arises in trying to specify the alternative at the sentence level, rather than at the discourse level.

A Surface Structure Approach: Jackendoff

In Jackendoff (1972), stress and intonation were considered to be phonological phenomena with semantic effects, which he attempted to specify within a surface structure framework. He defined focus itself in semantic terms (p. 230); focus denotes "the information in the sentence that is assumed by the speaker not to be shared by him and the hearer," while presupposition denotes the information which is assumed to be shared. However, Jackendoff argued (p. 230), as did Chomsky (1971), that "the focus is determined by the surface structure, as a phrase containing the main stress of the sentence." This approach, while it differs somewhat from that of Chambers (1970), still emphasizes syntactic properties as the defining characteristics of focusing. For this reason, Jackendoff's approach does not deal well with contrastive stress.

In general, contrastive stress is not easily discussed in the surface structure models for focus devices. Jackendoff noted (p. 234), as did Chambers (1970) and Chomsky (1971), "that emphatic stress occurring anywhere in a sentence attracts the focus." With this property of contrastive stress in mind, Jackendoff noted that some phrases which contain the intonation centre cannot be focused. For example (p. 234), in (15) below, the VP contains the intonation centre, but cannot be the focus:

(15) Did Fred HIT Bill?

Only the verb "hit" can be the focus; this dependence of stress position on the focus is stated in the following condition (p. 237):

> If a phrase P is chosen as the focus of a sentence S, the highest stress in S will be on the syllable of P that is assigned highest stress by the regular stress rules.

This principle certainly incorporates contrastive stress better than did Chomsky's original definition of focus, which was restricted to normal intonation. It is necessary to note, however, that "phrase" in the above statement can refer, for example, to the single word "hit" in sentence (15). This use of the term "phrase" allowed Jackendoff to include contrastive stress in his focus theory.

Jackendoff proposed that a syntactic marker F be associated with a node in the surface structure of every sentence. The semantic and phonological components would then make use of the marker F. One rule in the semantic component, for example, would be a version of the following focus assignment rule (p. 240):

> The semantic material associated with surface structure nodes dominated by F is the Focus of the sentence. To derive the presupposition, substitute appropriate semantic variables for the focused material.

The marker F must thus occur in every sentence. As an approximation to the phonological realization of F, Jackendoff proposed that emphatic stress be assigned to the main stress of the F constituent. He adopted the convention that emphatic stress does not weaken on successive cycles, unlike other stresses. He then noted (p. 242):

> Thus in the assignment of stress contour, the main stress of the constituent marked F will receive emphatic stress and all other stresses will have the values assigned by Chomsky and Halle's rules.

According to Jackendoff's proposal, the following sentences are indistinguishable, since in each case the final lexical item belongs to the constituent marked F and receives the main stress. In both (16a) and (16b), then, "Andrew" is assigned emphatic stress by Jackendoff's proposed rules.

(16) (a) John gave the book to Andrew.

(b) John gave the book to ANDREW.

Jackendoff did suggest refining his proposal along the lines that all stresses dominated by F be exempted from weakening on successive cycles. However, he concluded (p. 242) that "as judgments on stress become unreliable beyond a certain point ... I would hesitate to propose much beyond this point without thorough experimental work."

One further aspect of Jackendoff's model provides an interesting contrast to the syntax-based focus in Chambers' model. Jackendoff argued that the notion of semantic variables to be substituted for the focus in forming the presupposition has a nonsyntactic basis. The following is an example of an appropriate question-response pair (p. 243):

(17) (a) Did the cop ARREST Bill?
(b) No, he only LEERED at him.

The focus of (17a) is a transitive verb; that of (17b) is intransitive. Jackendoff concluded (p. 244) that "syntactic similarity is not a necessary condition for possible contrast." To show that it is also not a sufficient condition, he gave the following example (p. 244):

(18) (a) Did Fred turn the lights ON?
(b) No, he turned them OFF.
(19) (a) Did Fred turn the proposal IN?
(b) No, he turned it OUT.

Jackendoff claimed that (19b) is unacceptable. Thus, the sentence pairs (18) and (19) have similar syntactic structure, but the contrast between the particles is possible, according to Jackendoff, only in (18).

Jackendoff concluded (pp. 244-45) that:

> ...the semantic variable in the focus assignment rule must be assigned with respect to the semantic interpretation of the sentence, disregarding the syntax, in particular the deep structure.

Jackendoff's position, in disregarding the syntax when treating focus, is thus diametrically opposed to Chambers' claim that focus is obligatorily marked in deep structure.

A Semantic Approach: Chafe

Chafe's discussion (1970) of contrastive stress is brief. Because he considered the verb to be the central semantic unit, he defined a contrastive sentence as being one in which an inflectional unit contrastive is added to the verb. In the presence of a contrastive verb, the regular rules for determining what elements in the sentence are new do not apply, and any element may be marked new. Such an item is then focused on. In his view (p. 224), then:

> ... a contrastive sentence conveys the information that the new semantic unit within it has been selected by the speaker from various implied alternatives as the correct one ...

Chafe (p. 225) viewed the contrastive sentence (20)[1], a possible answer to (21) below, as homonymous with the sentence with normal stress which answers the question (22):

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[1] As in Chafe's sample sentences which are quoted in Chapter Two, underlining indicates high pitch and strong stress, which may or may not be contrastive.

(20) David emptied the box.

(21) Did David empty the box or the suitcase?

(22) What did David do?

The answer to (22), however, has the "unmarked" distribution of old and new information; that is, the verb root and the patient noun root are new. The contrastive reading of sentence (20) has the marked distribution in which only the patient noun root is new. Thus, in Chafe's model, the distribution of old and new information does not have clear phonological correlates.

Chafe (p. 226) noted that, in his model, the noncontrastive reading of sentence (20) has the same distribution of information as the contrastive sentence (23):

(23) David emptied the box.

He noted that the notion "new information" might need to be refined (p. 224):

> In a contrastive sentence, *new* means that the *choice* of the unit to which it is attached (rather than some other possible choice) is being presented by the speaker as new information.

Contrastive sentences, he suggested, might contain a specification labelled focus, rather than the specification *new*.

The importance of contrastive stress in Chafe's theory is illustrated by the following sentences:

(24) (a) What did David give (to) Lisa?

(b) David gave *Lisa a picture*. (normal stress)

(c) David gave Lisa a *picture*. (contrastive)

It is evident from Chafe's discussion that the contrastive sentence (24c) is acceptable as an answer to (24a), while (24b) is unacceptable. If only one NP in a dative sentence carries new information, that NP must be contrastively stressed.

Several theories of focus have been discussed in the last two chapters. In the following chapter, consideration is given to experimental treatment of focus. Some published experiments are assessed with respect to their contributions toward a theory of focus. Predictions based on the theories are also considered, in an attempt to clarify some of the issues which must be dealt with in further experimental work in the area of focus.

CHAPTER FOUR

EXPERIMENTAL TREATMENT OF FOCUS

Experiments Concerning Passivization

The more complete theoretical accounts of focus discussed in the previous chapters share the property of being very recent. For this reason, experimental literature in this area has had insufficient time to emerge. However, there have been several published experiments concerning the nature of passivization, a transformation which has here been treated as a syntactic reflex of focus. Some of the experimental literature on passivization is of interest here, although it must be remembered that the purpose of these experiments was not expressed in terms of the overall theories of focus which have been discussed in the preceding chapters.

Tannenbaum and Williams (1968) anticipated the current concern with semantics of discourse (Fletcher, 1973) and with treating passivization as a focus phenomenon (Chambers, 1970). They attempted to place what they called "conceptual focus" on either the actor subject or the acted-upon object in a simple situation and to assess the effects of such control on their subjects' "readiness to describe the situation in active or passive sentence forms," as measured by response latency. The authors did not define conceptual focus, but used it in their report as a synonym for "focus of attention" and "emphasis."

Their experimental procedure was to present a line drawing of a situation, such as a train hitting a car, together with a request for the subject to describe the situation in either an active or a passive sentence. The dependent variable was response latency, measured from the time the picture was presented until the subject's response was completed.

Conceptual focus was manipulated by presenting a preamble which centered on the subject or object (e.g., the train or the car), or a control preamble which focused on neither. Each preamble, which the subject read out loud, consisted of six sentences. A second variable in the preambles was the use of active or passive voice. Thus, there were six forms of preamble. A typical subject-focus, active-voice preamble was the following (p. 247):

> The Train -- Trains provide an efficient means of transportation for the traveler. First, a train eliminates the problem of traffic jams. [Etc.]

Other subjects, before seeing the same picture, read the corresponding preamble with subject-focus, passive-voice ("The Train -- An efficient means of transportation is provided by trains..."), with object-focus, active-voice

("The Car -- only people living in the richest countries use the car widely..."), with object-focus, passive voice ("The Car -- The car is used widely only by people living in the richest countries. Cars are driven in this country by as many women as men..."), or with a neutral focus, in either the active or passive voice.

The results showed a highly significant (p<.01) interaction between preamble focus and response latency, but no significant interaction between preamble voice and response latency (p>.10). Thus, the authors concluded (p. 249) that "the results do indicate a decided effect of the conceptual-focus manipulation upon readiness to encode in active and passive forms." Further, "there is a functional distinction between [active and passive sentence forms] stemming from different demand characteristics of the encoding situation."

Tannenbaum and Williams, then, approached passivization as being related to focus of attention, with some measure of success. Their notion of focus is not based on the "intonation centre" definition of Chomsky or Chambers, or on Chafe's "new information" definition. Rather, "focus of attention" in this experiment seems to be more closely aligned with the definitions of "theme" (Halliday), "topic" (Chambers), or "old information" (Chafe). What this experiment showed is that it is easier to produce a sentence of a given voice if the first noun phrase is the same as the focus of attention in the preceding discourse than if a later noun phrase is the focus of attention. In some sense then, it can be said that the notion "topic of a sentence," identified as the first noun phrase, has some psychological significance. The experiment has nothing to say about the psychological role of the "focused" elements of a sentence, defined by the linguists as new information and identified by intonational prominence. The experiment nonetheless represents a useful step toward understanding the nature of the semantic correlates of the active/passive distinction.

Johnson-Laird (1968b) also accepted the idea that the role of the passive is one of emphasis. His experiment was designed to test the nature of this emphasis on the logical object -- whether it was due to the object becoming the grammatical subject, or simply, as Johnson-Laird believed, to its being placed before the logical subject. For the experimental task, each subject was shown a pair of long narrow rectangles, one divided symmetrically and the other asymmetrically into two coloured areas. The subject was also presented with a set of four sentences, such as (1) below (1968b, p. 8). Each of these sentences correctly described the arrangement of colours in the rectangles:

(1) (a) There is a blue area that precedes a red area. (Normal active)

(b) There is a red area that a blue area precedes. (Inverted active)

(c) There is a red area that is preceded by a blue area. (Normal passive)

(d) There is a blue area that a red area is preceded by. (Inverted passive)

The subjects' task was to rank-order the four sentences according to their appropriateness in describing one stimulus of the pair as opposed to the other.

The resulting four groups, as coded and identified by Johnson-Laird (1968b, p. 9) were:

AO: the asymmetrical stimulus had to be described and its larger area [red, in (1)] was denoted by the logical object.

AS: the asymmetrical stimulus had to be described and its larger area [blue, in (1)] was denoted by the logical subject.

SO: the symmetrical stimulus had to be described and the larger area of the asymmetrical stimulus [red, in (1)] was denoted by the logical object.

SS: the symmetrical stimulus had to be described and the larger area of the asymmetrical stimulus [blue, in (1)] was denoted by the logical subject.

Johnson-Laird predicted that for the AO group, the first choice would be the normal passive, followed by the inverted active. This was expected because, according to Johnson-Laird (p. 10), both the normal passive and inverted active bring the logical object "to the front of the sentence," while the passive, by virtue of its markedness, is the more emphatic form. For similar reasons, the first and second choices for the AS group were predicted to be the inverted passive and normal active, respectively.

Although thirty-two subjects were involved in the experiment, there were only two subjects in each of the sixteen sentence set - picture groups, since each subject did the experimental task only once. The data, analyzed by employing rank order correlations and coefficients of concordance, indicated that there was significant agreement among subjects for the AO and AS groups. By graphing the data, Johnson-Laird observed that the subjects' responses were in agreement with the experimental predictions. Thus, he concluded (pp. 13-14):

> The passive, as hypothesized, is more emphatic than the active ... It is word order that indicates to what the emphasis is being given ... Word-order alone however, is insufficient to account for the results since it fails to explain the preference for the passive rather than the active. The results support both the voice factor and the word-order factor ...

The experimenter did not discuss the relative importance of word-order and voice in emphasizing one noun phrase or the other.

It is questionable, however, whether this experiment throws any light on the nature of the passive sentence form. The sentences used in the experiment were not simple actives and passives. Instead, the sentences involved an embedding; it was only in the embedded sentence that voice varied. According to linguistic theory (Katz & Postal, 1964, p. 73), sentence (1a) is derived from the following underlying structures by an embedding transformation:

(2) (a) There is a blue area.

(b) A blue area precedes a red area.

Thus, (2a) is the matrix sentence, and (2b) the embedded structure. The semantic correlates of such embeddings are not known. As long as the embedding transformation has semantic significance, however, the results of this experiment cannot be assumed to hold for the simple passive transformation. There has been no attempt in the experimental literature to investigate the significance of the "there is" construction. Chambers (1970, p. 27) suggested that such a construction has semantic significance, since he considered such sentences as (1a) and (1b) to be focus variants.

Although Chambers did not develop this idea, it seems reasonable to suggest that the "there is" construction is of semantic significance, perhaps in much the same way that clefted sentences provide focus variants of their corresponding simple structures. If one can assume that the "there is" construction is similar in nature to clefting, then it is useful to consider the results obtained in Fletcher's study (1973). Half of Fletcher's subjects considered only the features of the superordinate sentence relevant in choosing appropriate answers from a P'-equivalent set to a given question. In locating appropriate descriptions for a picture, also from a P'-equivalent set, Johnson-Laird's subjects may well have reverted to the same strategy.

Clearly, then, the technique which Johnson-Laird chose was unsuitable as a way of investigating the nature of the emphasis which the passive form is supposed to put on the logical object. If the statistical design had been more substantial, then this experiment might have been comparable to Fletcher's. That is, Johnson-Laird was actually investigating paraphrase relations for a particular syntactically well-defined subset of English sentences. While it may be correct to regard the purpose of passivization as a reshuffling of emphasis, this experiment is unable to shed any light on which of the two co-occurring syntactic reflexes of passivization is the more significant.

Another experiment concerning the possible role of the grammatical subject as a conceptual and attentional focus was reported by James (1972). He made a distinction between speaker emphasis and listener focus. While he did not question the results of the experiments of Johnson-Laird (1968), and Tannenbaum and Williams (1968) concerning evidence that the speaker places the word to be emphasized in the subject position, he did question the extension of such evidence to arguments that the listener takes the grammatical subject as a conceptual focus. Such arguments are based on data from free recall experiments involving active and passive sentences with transitive verbs (e.g., Clark, 1966), which generally indicate that surface structure subjects are recalled more often than surface structure objects.

It is the free recall experiments that James objected to; he suggested that there are inherent recall differences between subject and object nouns which must be controlled in any experiment. Considering evidence that transitive verbs are more likely to take an animate subject than an animate object, that only inanimate nouns may be abstract, and that concrete nouns are easier to recall than abstract ones, James concluded that, for randomly selected sentences, the subject noun stands a better chance of being recalled, regardless of its syntactic function.

His experiment, therefore, involved varying the imagery value of subjects and objects for active and passive sentences. Examples of his sentences (p. 206), with imagery values of subject and object indicated in parentheses, are:

(3) (a) The library sold the piano. (high-high)
(b) The policeman prevented the nonsense. (high-low)
(c) The explanation satisfied the photographer. (low-high)
(d) The event undermined the economy. (low-low)

For the active sentences, James found no significant difference between the number of subjects and objects recalled, contrary to the findings of earlier memory experiments. The subject-object difference was not significant when both were of low or high imagery value. For high-low sentences, significantly more subjects than objects were recalled, consistent with findings of the earlier experiments, which had inadvertently used only sentences of this type. No significant difference occurred in low-high sentences, although James had expected a higher object recall. Similar results were obtained for passive sentences except in the low-high sentences, where the subject-object difference was significant (p<.05). James' conclusion, a reasonable one, was that theme or focus of attention, an important concept for both speaker and listener, is likely determined by nonsyntactic factors and may not be common to both speaker and listener.

James' experiment, aside from being interesting in its own right, supports some of the important observations by Fillenbaum (1970) concerning memory experiments. Fillenbaum questioned the validity of drawing inferences about underlying syntactic structures on the basis of memory tasks. His example was the experiment by Clifton and Odom (1966) in which confusions among sentence types were observed in a recognition task. Clifton and Odom had suggested, on the basis of their experiment, that affirmative and negative questions were semantically synonymous. Using the more direct methods of paraphrase, equivalence judgments, and production of speaker expectations, Fillenbaum found differences between these two sentence types. In the paraphrase task, for example, changes in mood were much more frequent ([illegible] as opposed to [illegible]) than changes from affirmative to negative or conversely.

Fillenbaum suggested that the kind of analysis required of the subject in a memory task is different from that required for full understanding of the sentence. The latter task, Fillenbaum noted (p. 231), requires "a relatively full syntactic and semantic analysis which is sensitive to changes in meaning and to possible differences in meaning."

Secondly, Fillenbaum observed (p. 231) that the data from memory tasks "provide information simultaneously about possible underlying structures and about semantic and conceptual processes; generally it will not be possible to factor this information into its components." This observation is aptly demonstrated in James' experiment. The role of recency in memory processes had been ignored in earlier experiments. James brought that problem to light, but there could equally well be other aspects of memory processes which are still being ignored in current psycholinguistic experiments.

With regard to Fillenbaum's first observation, it is interesting to note that James' experiment, while it appears to be inadequate, has come to the conclusion that there are no significant differences in the number of recalled subject and object nouns. Perhaps, if Fillenbaum is correct, the memory task is not sensitive enough to pick up such differences. Because of the complexity of memory tasks, and their possible blurring of fine differences in meaning, then, other methods seem more appropriate at this time in the investigation of these, or of focus in general.

Grieve and Wales (1973) varied not only sentence voice but also the definiteness of the sentence NPs in an attempt to study the effect of passivization on the relative importance of the sentence constituents. They presented subjects with thirty-two simple sentences which varied systematically according to voice and definiteness. Subjects were instructed to consider each sentence as the answer to a question, and they were asked to supply the appropriate question. Grieve and Wales hypothesized that the effect of definiteness would predominate over the effect of voice for this task. Their prediction was that the subjects would tend to include the definite NP in the questions which they constructed, and to leave out the indefinite NP. For the active sentence "[illegible]," then, Grieve and Wales predicted that the subjects would tend to supply the question "What did the [illegible]"

The results, as analyzed by a chi-square statistic, bear out the predictions based on definiteness more clearly than predictions based on word order. In interpreting their results, however, the authors assumed that the NP which the subjects specifically asked a question about is the most important NP, although this assumption is unjustified. They concluded [illegible]

It would seem that the important entity of an

> utterance is not solely indicated by voice and word order, but is more closely concerned with definiteness.

A more reasonable interpretation of the results would be within the framework of given and new information. Thus, the results indicate that the given information or topic in the sentence is more closely correlated with definiteness than with word order. This was the approach taken by [illegible] (1975), although he did not question the interpretation of the results in the Grieve and Wales paper.

[illegible] and [illegible] (1979, p. 180) recognized that the grammatical subject and grammatical object of a sentence are both prominent, in different senses:

> The grammatical subject is important as the theme of the sentence and the grammatical object as the focus of the contextual structure.

They noted that the prominence of the grammatical subject had been demonstrated in earlier psycholinguistic experiments; the aim of their own experiment was to investigate the focal function of the grammatical object. They used [illegible] definition of focus (1971), the constituent in the NP at the end of the sentence, that is, the last NP of the prepositional phrase.

The following prediction underlies their experiment: in a [illegible] sentence, when some part of the information is omitted, the attempt to remember the sentence in the context

"I thought ...but I was mistaken", the focal phrase of the original passive is more likely to be interpreted as mistaken information than is the presuppositional phrase. For active sentences, they predicted that the focal and presuppositional phrases were equally likely to be interpreted as the mistaken part of the information.

Subjects were given, in written form, an active or a passive sentence in which some part of the information was denied, either by an embedding such as the one shown, or by a simple negative sentence. They were also given two alternative sentences, one of which denied the involvement of the logical subject (LS) in the sentential proposition, while the other denied the involvement of the logical object (LO). For example, subjects were given either (43) or (44) below, together with (45) and (46):

(43) (a) Fred didn't recommend the people to Kate.
(b) The people weren't recommended to Kate by Fred.

(45) Fred recommended the people to someone else; Kate doesn't know it.

(46) Someone else recommended the people to Kate; [illegible] [illegible].

Subjects were asked to determine which of the two choices (45 or 46) were congruent with the initial sentence (43 or 44).

The experimental predictions were supported by a t-test on the mean number of choices for the two alternatives as a function of voice. The authors concluded (p. 194) that the agent in the passive is "the focus of the assertion."

The statistical analysis of the data, as reported, was inadequate. An analysis of variance would have been preferable to a t-test, since the denial of information in the experimental sentences was accomplished in two distinct ways, either by an embedding or by a simple negation. This variable was not investigated. Thus, the conclusion that the agent in the passive is "the focal point of the information asserted by the sentence (p. 193)," might well be justified only for passive negative sentences.

Other Examples [illegible]

The above experiments are typical of the existing literature regarding focus analysis. In particular, they illustrate the limited scope of such experimental work; to date, consideration alone about the possible syntactic effects of focus has been investigated. Concern in these experiments has often been centered on the changes in grammatical subject and word order which are brought about by passivization. This interest is clearly shown in Hornby (1971), and Johnson-Laird (1968a).

Passivization is not, however, the only syntactic phenomenon which is amenable to investigation as a focus device. Several other possibilities were discussed by Chomsky (1971). In particular, he regarded the following sentence pairs as focus variants (p. 27):

(5) (a) Murray gave Selma the ring.
(b) Murray gave the ring to Selma.

(6) (a) Many toys are in the box.
(b) There are many toys in the box.

(7) (a) Chris hit who with the lunch pail?
(b) Who did Chris hit with the lunch pail?

(8) (a) It seems that John is a fool.
(b) John seems to be a fool.

In addition, Chambers viewed the processes of topicalization, clefting, and contrastive stress as focus devices (p. 25):

(9) (a) Jean, he hit Sean.
(b) It was Jean who hit Sean.
(c) JEAN hit Sean.

Such processes have not been thoroughly investigated experimentally; as mentioned earlier, most of the experimental work on focus concerns just one of its syntactic reflexes, namely passivization.

Of the above processes, which are not intended to represent a complete list of focus devices, (6) occurs in the literature in the experiment by Johnson-Laird (1968b) which was previously cited. However, the focusing properties of the "there is" construction were not acknowledged by Johnson-Laird, who claimed to be investigating passivization. As a result, that particular experiment was somewhat uninformative. Secondly, sentences of the type (8b) were investigated by Fletcher (1979); his experiment brought to light some interesting focus properties of clefted sentences. Otherwise, however, these processes have not been investigated.

The focus processes of interest in the present study are passivization, dative movement, and contrastive stress. These three were chosen because they can all occur in a single sentence; their interaction, therefore, can be studied and may provide additional information about the nature of focus, and the relative impact of different focus devices.

SOME EMPIRICAL QUESTIONS

A comparison of the theories of focus -- in particular, of the more thorough theories of Jackendoff (1972), Chomsky (1970), and Chafe (1976) -- has revealed some interesting empirical questions. The predictions of these theories concerning the nature of passivization, dative movement, and contrastive stress are of interest to the present study.

First, although passivization has often been investigated, its semantic significance as a focus device is still at issue. Chomsky claimed that passivization increases the prominence of an object NP by front-shifting it. The psychological validity of this proposal, as well as that of Chafe's suggestion that the back-shifted agent NP is also focused, requires further investigation.

The passive sentence form has been widely regarded in the theoretical literature as a syntactically marked form of the active sentence in English. This is true, for example, of all the theoretical accounts discussed in chapter two. In addition, the passive form is regarded by some linguists as being marked in a focus sense. Chambers (1970) proposed that the marker [+TOPIC] occur in the feature matrix of certain NP's at the deep structure level. Such a marker would then trigger passivization. Johnson-Laird claimed experimental support from two of his studies (1968a, 1968b) for the hypothesis that "the passive implies that the logical object is more important than the logical subject, whereas the active implies that there is a minimal difference in the importance of these two entities or that the logical subject is slightly predominant (1968b, p. 7)."

Thus, in some sense, both Chambers and Johnson-Laird considered a passive sentence to be marked with respect to focus, while the corresponding active is not. Chafe (1970) considered the passive form to be semantically distinct in focus properties from the active; however, in his model, the passive does not involve a "marked" distribution of information. For Chafe, the passive is not a *more* focused form than the active. Instead, passivization simply redistributes the NP's so that different ones are focused as new information.

A common formulation of the passive rule is that stated by Chambers (1970, p. 47):

PSV (optional)
SD: NP AUX V NP
SC: 1 2 3 4 ⟹
4 2+be+en 3 by+1

As discussed in Chapter Two, this formulation is inadequate for dative sentences; a more general form of the rule, based on the formulation given by Thomas and Kintgen (1974, p. 155), is this:

PSV (optional)
SD: NP AUX V NP X
SC: 1 2 3 4 5 ⟹
4 2+be+en 3 5 by+1.

For dative sentences, X includes the second object NP. According to this formulation, the passive transformation orders the agent NP last in the sentence, but does not affect the order of the other NP's, relative to each other.

The significance of the dative movement transformation as a focus device is also at issue. Dative movement has been of less theoretical interest than passivization; moreover, its treatment, even though scant, is not unified. Even the underlying form is not agreed upon. Chambers (1970) reported formal arguments from the literature for both forms. Fillmore (1965) arbitrarily selected the form

(10a) as base form, while Emonds (1972) chose (10b). Syntactic evidence in support of either form as basic is lacking; Chambers' own choice, (10a), was equally arbitrary, but fits in with the intonation view of focus.

(10) (a) John gave Andrew the book.
(b) John gave the book to Andrew.

Jackendoff chose (10b) as the underlying form, on the grounds that the NP-PP structure is common in English, while NP-NP is rare.

Dative movement is not usually likened to passivization; it is a strong point of Chambers' theory that the two processes are viewed as similar. The similar function of both rules is to permute NP's; this useful observation is readily made in a focus context, although even from this point of view it is not always noticed. Whether the permutation of NP's which occurs in dative movement has a similar focusing effect to the re-ordering in passivization is not known. In Chambers' proposal, dative movement and passivization are treated as if they had similar focus effects. Chafe, though, considered dative movement to have no focus effect unless it occurs with passive verbs. It is surprising that Chafe did not view dative movement as semantically significant in general, since he has stated (1971, p. 11) that "the notion that language is full of paraphrases, in the sense of different surface structures which reflect the same semantic structure, is mistaken."

Chambers' treatment of dative movement as similar to passivization is preferred here to Chafe's more complicated and less insightful analysis. Chambers' more detailed assessment of the way in which dative movement operates, however, does not share the merit of his observation regarding NP permutation. His view is that the more emphatic position for the indirect object is at the end of the sentence. This view is based on Chomsky's intonation centre view of focus. In Chomsky's model, postponing an NP to the end of the sentence cannot result in a sentence in which that NP is unambiguously focused.

It seems unreasonable that a speaker would attempt to focus an NP by back-shifting it, if this process cannot result in an unambiguous focus for the listener. The intonation centre view of focus is thus a suspect one, from a psychological standpoint. However, Chambers' observation that dative movement is similar to passivization is a sound one. To incorporate it into a theory of focus is desirable; however, it is also important to consider the possibility of developing a model of focus which is suitable as a hearer description.

One way to incorporate both properties into a single theory is to discard the definition of focus as "a phrase containing the intonation centre." Then, the model could allow dative movement to act like passivization does in Chambers' model-- that is, emphasizing an NP by front-shifting it. For this reason, (10b) is chosen here as the underlying form, and the following is the approximation to the dative movement rule which will be preferred in this study:

DATIVE (optional)

SD: V NP P NP

SC: 1 2 3 4 ==>

1 4+2 Ø Ø

Dative movement, then, determines the order of the patient and beneficiary NP's, relative to each other.

In Chafe's model, one purpose of passivization is to focus the agent NP, in the sense of indicating that it conveys new information. This notion of the agent NP achieving some prominence by passivization is not found in Chambers' analysis, where back-shifting an NP sometimes is a reflection of focus, as in dative movement, and sometimes is not, as in passivization. As mentioned earlier, it is Chambers' treatment of dative movement, not that of passivization, that is viewed here as needing improvement.

Also at issue is the notion that contrastive stress is more important as a focus device than passivization or dative movement (Chambers, 1970, p. 124). Chafe (1970, pp. 222-23) stated much the same view; he argued that contrastive sentences have a more marked distribution of information than do passive sentences.

A further question, important to an overall understanding of focus, is how passivization, dative movement, and contrastive stress affect the semantic structure of the sentence as a whole. In particular, it may be that the potential focus devices discussed here affect not only the prominence of the words relative to each other, but also the strength of the ties within different groupings of the words.

The Experiment

The purpose of the experiment in this study is thus to investigate passivization, dative movement, and contrastive stress as focus devices. In particular, an attempt is made to compare the relative impact and scope of their effects.

According to the framework discussed in Chapter Two, focus variants can be considered to be Pt-equivalent sentences in which the constituents differ in their importance relative to each other. Relative prominence of constituents is assumed to be a semantics of discourse property. Thus, focus variants are not Sd-equivalent; they are not all equally suitable utterances in a given context.

The investigation of these differences in importance was thought to be best accomplished by a direct method. Subjects, therefore, were asked directly for judgments of the importance of various sentence constituents. The basic experimental task was to rank order certain specified words from a sentence, according to their importance to the meaning of the sentence. This direct technique was thought to be preferable to a task involving memory, for the reasons mentioned (p. 59 above) in discussing Fillenbaum (1966).

In the first experimental task, subjects were asked to judge the importance of words in a sentence relative to each other. Secondly, it is appreciated that word-by-word decisions on the subjects' part may be unnatural as compared to actual language use. With this problem in mind, a second task was designed in which subjects were asked to rank order pairs of words. The inclusion of this task thus represented an attempt to investigate the effects of passivization, dative movement, and contrastive stress on the semantic structure of the sentence as a whole. In order to complete the design, a third experimental task was added -- the subjects were asked to rank order triples of words. It was anticipated that the results from this task would add to the information regarding the overall effect of each of the focus devices on the entire sentence.

CHAPTER FIVE

METHOD

Stimulus Material:

Subjects were presented with simple dative sentences of the following basic form:

(1) John gave the book to Andrew. (A/B)

In (1), John is agent (subject), book is patient (direct object), and Andrew is beneficiary (indirect object). The syntactic variants of this sentence which result from application of combinations of the passive and dative movement transformations were also presented:

(2) John gave Andrew the book. (A/F)
(3) The book was given to Andrew by John. (P/B)
(4) Andrew was given the book by John. (P/F)

The coding to the right of sentences (1)-(4) identifies their structure in terms of voice and indirect object position as follows:

(a) A refers to an active sentence, P to a passive sentence.

(b) B refers to the back indirect object position --

the indirect object follows the direct object.

F refers to the forward indirect object position

-- the indirect object precedes the direct object.

Contrastive stress variants were also present. Thus, for the (A/B) sentences, the following patterns of contrastive stress occurred:

(5) John gave the book to Andrew. (A/B/N)

(6) John GAVE the book to Andrew. (A/B/V)

(7) JOHN gave the book to Andrew. (A/B/G)

(8) John gave the BOOK to Andrew. (A/B/D)

(9) John gave the book to ANDREW. (A/B/I)

The contrastive stress coding is as follows:

(a) N indicates no contrastive stress.

(b) V,G,D,I refer to contrastive stress on the verb, agent, direct object, and indirect object, respectively. Contrastive stress occurs only once in each of these sentences.

The same constituents were contrastively stressed for the (A/F), (P/B), and (P/F) sentences. There were therefore twenty distinct sentence types -- five contrastive stress positions in each of four syntactically distinct sentences.

The sentences also varied in semantic content. In addition to sentence (1), three other contents were used:

(10) Peter handed the flashlight to George.

(11) Joanne sent the picture to Jack.

(12) Bill offered the magazine to Betty.

In choosing the four sentence contexts, the use of semantically loaded terms was avoided. It was thought that, as a consequence of this choice of innocuous lexical items, the variation in semantic content in the experimental sentences would not influence the subjects' judgments. Semantic content was not treated as a factor in the analysis of the data. The experimental results (see Chapter Six) thus cannot be claimed to hold for sentences which contain semantically loaded lexical items.

In order to safeguard against an effect reported by Wales (1970), only definite articles were used in the direct object NP. Wales (1970) reported a significant interaction between definiteness and focus, with subjects tending not to regard indefinite noun phrases as focused. It is recognized that a definiteness effect may be inescapable for the type of sentence chosen here, since both proper nouns and definite NP's were used. It is not known whether proper nouns and definite NP's differ significantly in their focus possibilities. Since proper nouns are regarded linguistically as being definite (Wales, 1970, p. 71), the direct object NP was made definite rather than indefinite in order to minimize possible differences in focus properties between the agent and indirect object NP's, and the direct object NP.

Each of the twenty sentence types appeared once in the study in one of the four semantic contexts. The order of presentation was randomized, with the restriction that no two of the same context or of the same syntactic type occurred in sequence. One practice sentence preceded the experimental sentences. A list of the twenty experimental sentences, in the presentation order, is given in Appendix A. The sentences were tape-recorded, as were the subject instructions (Appendix B). The stress pattern of each of the recorded experimental sentences was evaluated independently by several of the teaching staff and graduate students of the Linguistics Department, in order to ensure that the stress patterns were as described in Appendix A.

Subjects and Procedure

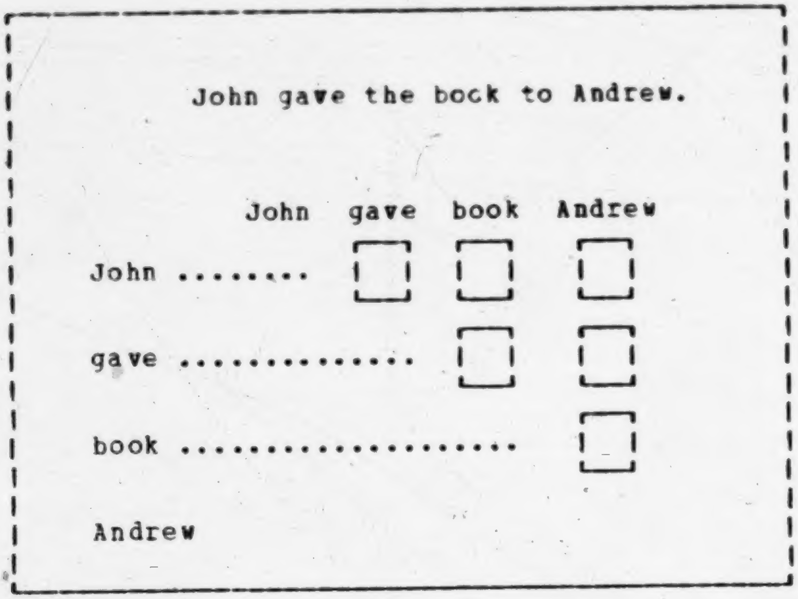
The subjects (Ss) were 79 high school students attending Jasper Place Composite High School in Edmonton. The experiment was conducted during three regular classroom sessions; one class from each of the high school's grade levels (10, 11, and 12) served as subjects. Each S was a native speaker of English, with no known hearing impairment.

The experiment was paced by the slowest member of the group, since aural presentation was used. In order to make supervision of the experiment more manageable, each class of subjects was divided into four groups, with a maximum of nine subjects in a group. Each group listened to the recorded material over headphones at a separate listening centre. Thus, each group could proceed at its own rate. Four University of Alberta graduate students assisted the experimenter; each supervised a group of Ss.

There were three experimental tasks (Appendix B). All Ss did the tasks in the same order. For each task, each S had an answer booklet. Each page of the booklet corresponded to one of the sentences on the tape. The page contained the written version of the sentence (contrastive stress was not indicated) and, for the first task, a list of four words from the sentence (agent, verb, patient, and beneficiary) with a box beside each word.

Ss were instructed to rank order the words according to their importance to the meaning of the sentence, 1 indicating the most important and 4 the least important word. Ss were urged to listen to the sentence on tape before turning to the appropriate page. This was done in order to ensure that the Ss did not impose their own stress pattern on the written sentence, but rather made their choices on the basis of the recorded version. Each sentence was recorded three times in succession on the tape, with about three seconds between presentations. The tape was stopped between different sentences until all Ss in the group had completed their ranking.

The second experimental task was similar to the first. Ss were asked to rank order the six pairs of words (verb/agent, verb/patient, verb/beneficiary, agent/patient, agent/beneficiary, and patient/beneficiary) according to their importance to the meaning of the sentence. The sentence set was the same as that used in the first task. The subjects' booklets for this task had a sentence on each page, as in the first task. Below the sentence was a set of six boxes indicating the six pairs of words to be ranked. The boxes were arranged in a matrix pattern, as illustrated in Figure 1. The four words which form the pairs were



John gave the book to Andrew.

	John	gave	book	Andrew
John		☐	☐	☐
gave			☐	☐
book				☐
Andrew				

Fig. 1. Sample page for second task.

listed as in Figure 1, in the order in which they occur in the sentence. It is recognized that this may lead to a left-to-right bias in the ranking. If some of the pairs are difficult to rank, there is a possibility that Ss may fill in the rank numbers from left to right, or top to bottom.

However, it was found unwise to scramble the word order. Scrambling would make it more difficult to keep track of all the pairs, especially since each of the sentences contains two proper nouns.

The third experiment was similar to the first two. Ss were instructed to rank order the four triples of words (verb/agent/patient, verb/agent/beneficiary, verb/patient/beneficiary, and agent/patient/beneficiary) according to their importance to the meaning of the sentence. As in the earlier tasks, each page of the answer booklet contained the written version of one of the sentences. Below the sentence was a list of the four triples from the sentence, with a box beside each triple.

The three experimental tasks together consistently required approximately one hour to complete, for all the groups. One group (7 Ss) in the Grade 11 class was unable to complete the third task in the class time available, due to tape recorder difficulties earlier in the session.

CHAPTER SIX

RESULTS

Basic Approach

The analysis of the experimental data was based on two complementary statistical techniques, because both the inter-subject variation and the treatment effects are of interest. A standard analysis of variance (ANOVA) was used to assess the statistical significance of the effects of passivization, dative movement, and contrastive stress. In addition, the nature of the variation among subjects was explored by employing an analysis for ranked data based on Winer's method (1971, p. 301). In both analyses, the responses from all 79 Ss were analyzed together. A preliminary analysis of variance had indicated that there were no significant effects due either to the Ss' age, grade level, or sex, or to the fact that four graduate students had supervised different groups of Ss.

The analysis for ranked data provided information about the differences among Ss, although it maintains an emphasis on the sentence properties, rather than on individual S rank score profiles. The input required for this analysis is a concise arrangement of the data which permits the main trends to be seen from the data tables themselves.

First Task Results

Appendix C gives a summary of the data for the first task, which consisted of rank ordering the four terms according to their perceived importance to the meaning of the sentence. Each column in Tables C-1 and C-2 represents one of the twenty different sentence types used in the experiment, while the four words which the Ss were asked to rank and the four possible ranks for each word are represented as rows in the table. The number of Ss who assigned a given rank to a particular word for each of the twenty sentence types is given in the tables. For example, fourteen Ss assigned rank 1 to the verb for the active sentence with back dative position and no contrastive stress (John gave the book to Andrew), while for the same sentence type, fifty-five of the Ss chose the agent as the most important element.

Analysis for Ranked Data

These data were analyzed using an analysis for ranked data (Winer, 1971, p. 301). This analysis consists of the Friedman test for mean rank differences, and a test of the significance of the average intercorrelation between Ss. Both computations involve a separate analysis for each column of the data in Tables C-1 and C-2.

For each sentence type, the Friedman test indicates the significance of the differences in importance of the four words which the Ss ranked. Where these differences are not significant, one may infer either that the Ss were responding randomly because there was no basis provided for differential responses, or that they actually perceived the terms as being of roughly equal importance.

The Friedman test uses the chi-square statistic. These chi-square values are given in Table C-3 and are all, with two exceptions, highly significant ($p<.01$). The significant chi-square values indicate that there were reliable differences in importance among the four major words for most sentence types, as far as these Ss were concerned. For example, for the first sentence type (A/B/N), the differences among the average ranks assigned for the verb (2.34), agent (1.54), direct object (2.66), and indirect object (3.46), can be viewed as reflecting reliable differences. These average ranks can be computed from Table C-1. Most sentence types, then, did provide a viable basis for making differential judgments. There was no significant difference in the importance of the four major words in only two sentence types:

(1) John gave the book to ANDREW. (A/B/I)
(2) Andrew was given the book by JOHN. (P/F/G)

In the second part of the analysis, the average intercorrelation between Ss, r', is computed. This statistic represents, for each sentence type, the inter-subject agreement for the rankings, and is given in Table C-3. For sentence types in which r' is not significant, then, there is no evidence that the Ss shared a common view of the relative importance of the four words. The average intercorrelations between Ss for the data in Table C-3 range from .003 to .460. Ten of them are highly significant ($p<.01$), indicating that for half of the sentence types investigated, there was significant agreement among the Ss concerning the rankings of the four words.

In general, the highly significant intercorrelation values occurred for the sentence types in which contrastive stress was on the first or second element (first noun or the verb), while smaller values of r' occurred when the third or fourth element was contrastively stressed. The smaller inter-subject agreement for the latter sentence types suggests that the contrastive stress seemed to be in conflict with the position focus devices for these sentence types. This resulted in ambiguity concerning the focused item in the sentence and caused the confusion or lack of agreement among the Ss.

This analysis of the ranked data shows, then, that some sentence types result in highly significant inter-subject agreement for the rank-ordering task, while other sentence types do not. From the pattern of significance of the average intercorrelation values, it seems that stressing the third or fourth word is an ineffective focus strategy, since it results in ambiguity concerning which item is focused. In the two worst cases (sentences 1 and 2 above), in fact, stressing the final element caused so much ambiguity that the Ss as a group could not consistently discern significant differences in the importance of the four words.

Another point of interest from this analysis is that the average intercorrelation values are generally low. This indicates a somewhat weak general consensus and suggests that clear and consistent assignment of all ranks did not occur. The most reliable segment of the ranking process, of course, is the Ss' first choice; following that, the second, third, and fourth choices may be indistinguishable, or assigned more at random. To minimize this latter aspect, the following discussion will focus on the Ss' first rank scores.

Table C-4 expresses the first rank results of Tables C-1 and C-2, but in percentage form rather than as frequencies. These tables show, for each of the four words which were ranked (rows) in each of the twenty sentence types (columns), the percentage of the Ss who assigned the first rank to that word. Thus, 86% of the Ss considered the agent to be the most important word to the meaning of such sentences as "JOHN gave Andrew the book" (A/F/G), while 4%

considered the agent to be the most important word in sentences of the form "ANDREW was given the book by John" (P/F/I).

It has been noted previously that some sentence types resulted in low inter-subject agreement in the overall ranking task. The lowest r' value, .003, occurred for such sentences as "Andrew was given the book by JOHN." This sentence type is represented in the P/F/G column of Table C-4. It can be seen from the numbers in this column that the S̲s as a group did not resort completely to random guessing for this sentence; rather, a two-way split in S̲ strategies is evident, with 41% choosing the stressed element as most important and 30% opting for the first word in the sentence. Thus, 71% of the S̲s chose either the first word or the stressed word, while only 29% chose one of the other two words. This response pattern differs significantly from the random response of an equal number of S̲s choosing each of the four words. This is indicated by the chi-square statistic, which was highly significant ($p<.005$) for this sentence type as well as for all the other sentence types. Thus, even for an average intercorrelation of .003, the S̲s were not responding randomly.

The highest r' value, .46, was obtained for sentences such as "The BOOK was given to Andrew by John." Here, in the P/B/D column of Table C-4, it is clear that no split in S̲ strategy occurred, since 84% of the S̲s chose the direct object as the most important word to the meaning of the sentence. For this sentence type, stress occurs on the first noun of the sentence.

From Table C-4, it is apparent that the first noun in each sentence type is regarded, on the average, as more important than the other nouns or the verb. To facilitate discussion of the two main S strategies -- choice of the stressed item, and choice of the first noun -- the data of Table C-4 are re-arranged in Table C-5. The rows of Table C-5 indicate the four words which the Ss ranked, identified by their position in the sentence; the columns indicate the stress location, again according to the position of the stressed word in the sentence. The dependent variable is the percentage of Ss who assigned a rank of 1 to the given word under the specified conditions.

In Table C-5, it can be seen that when stress occurs on the first noun, it is chosen as most important on the average by 81% of the Ss. In the unstressed sentence types, the first noun is chosen by 65%. When stress occurs on the verb, second noun, or third noun, the stressed element is chosen as most important by 58%, 44%, and 34% of the Ss respectively, while the first noun of the sentence is chosen by 31%, 39%, and 43% for these three sentence types respectively.

In all cases where stress occurs, then, the data show that 77%-89% of the Ss choose either the first noun or the stressed element as being the most important word. Thus, the results suggest that there are two main kinds of focus device operating in the stimulus sentence types. The first is contrastive stress; the second involves word order -- in particular, since the first word in the sentence is often chosen, the device of front-shifting may be regarded as a focus device.

Front-shifting is represented in the stimulus sentences by two syntactic operations, passivization and dative movement. The effect of these devices separately, as well as that of contrastive stress, can be observed in Tables 1, 2, and 3, which were obtained by grouping the data of Table C-4. For example, Table 1 shows the effect of passivization on the Ss' rankings. Thus, for the ten active sentences, an average of 53% of the Ss chose the agent as the most important element. For the passive sentences, an average of 37% of the Ss chose the direct object as the most important

TABLE 1

PERCENT DISTRIBUTION OF FIRST RANK

VOICE EFFECT

Item Ranked	Active	Passive
Verb	24	21
Agent	53	13
Direct Object	13	37
Indirect Object	11	29

item, while 29% chose the indirect object. For half of the passive sentences, the direct object was the first NP in the sentence, and for the other half, the indirect object appeared first.

Table 1 shows that passivization has no effect on the Ss' choice of the verb as most important element. However, passivization does cause a large decrease in the percentage of Ss who choose the agent, and an increase in the percentage of Ss who choose the direct object or the indirect object. The direction of the change supports the notion that the aspect of passivization which is most relevant as a focus device is front-shifting.

Table 2 shows that dative movement has no effect on the percentage of Ss who choose the verb or the agent as the most important word. Dative movement, considered as a front-shifting of the indirect object, does cause a decrease

TABLE 2

PERCENT DISTRIBUTION OF FIRST RANK

DATIVE POSITION EFFECT

Item Ranked	Back	Forward
Verb	22	23
Agent	32	34
Direct Object	36	14
Indirect Object	10	30

in the percentage of Ss who choose the direct object (from 36% to 14%) and a corresponding increase in the percentage of Ss choosing the indirect object (from 10% to 30%). Thus, dative position is a significant focus variable which determines the relative preference of Ss for the direct versus the indirect object. Of these two nouns, more Ss chose the one which occurred earlier in the sentence. Thus, dative movement, by reversing the order of the direct and indirect objects, altered the relative importance of these two nouns.

The effect of contrastive stress is shown in Table 3, where the rows represent the words which the Ss ranked, and the columns represent the five different stress locations. As expected, this table shows that stressing any one of the four words causes an increase in the percentage of Ss who view that word as the most important.

TABLE 3

PERCENT DISTRIBUTION OF FIRST RANK

CONTRASTIVE STRESS EFFECT

Item Ranked	N	V	G	D	I
Verb	17	58	13	11	14
Agent	36	21	59	26	22
Direct Object	25	13	17	52	16
Indirect Object	22	8	10	12	48

The data as arranged in Tables 1, 2, and 3 provide an indication that passivization, dative movement, and contrastive stress each influenced the Ss' choice of the most important element in the sentence. A full analysis of these focus effects is provided by the standard analysis of variance technique.

ANOVA Results

The ANOVA design that was employed here does not provide an assessment of the significance of the Ss effect or any Ss-by-treatment interactions. The ANOVA would clearly be inappropriate if any one of the possible Ss-by-treatment interactions proved to be characterized by a significant crossover pattern, suggesting radical differences in subject response strategies. A hierarchical clustering analysis (Veldman, 1967, p. 308) was employed in order to investigate the nature of possible subject differences. This analysis indicated that the strategy differences were minor; they represent the relative sensitivity of the Ss to each of the treatments, rather than opposite reactions by different Ss to any given treatment. The hierarchical clustering technique will be discussed in greater detail later in this chapter.

The ANOVA model used here was a three-way, fixed effects, factorial design, with Ss serving as randomized blocks. The three treatment factors were voice (two levels), dative position (two levels), and contrastive stress (five levels). The dependent variable was the rank that the subject assigned to the verb, agent, direct object, and indirect object. The data consisted of this measure for each of the twenty sentence types and each of the 79 subjects. Four separate analyses of variance were carried out -- for the verb, agent, direct object, and indirect object rankings. The computer program employed was BMD:08V (Dixon, 1970). A summary of the results is given in Appendix D.

Table D-1 summarizes the results of the Ss' rankings of the verb under the various conditions of voice (V), dative position (DP), and contrastive stress (C). Of these, only the effect of contrastive stress was significant ($p<.001$). Passivization and dative movement both shift the position of noun phrases, but neither affects the linear position of the verb in the sentence. It is reasonable, therefore, that they should not act as focus devices as far as the verb is concerned. The interaction VxDPxC was significant ($p<.01$), but did not shed any light on the interpretation of the verb rankings.

In Table D-2, the results of the agent rankings are given. Voice and contrastive stress variations both resulted in highly significant ($p<.001$) F ratios. Passivization determines the relative linear positions of the agent and any other noun phrases in the sentence, and thus the strong focusing effect on the agent is not surprising. Dative movement, on the other hand, has no effect on the linear position of the agent for the sentences under consideration, since the agent is either first or last in the sentence, depending on the voice. Thus dative position, as expected, is not a significant factor in the analysis of variance for the agent. The significant ($p<.01$) interaction VxC can be inferred from Figure D-1. It can be seen from this graph that the interaction is primarily related to the large difference in agent mean rank between the active and passive forms in the normal stress case. The greater difference in the mean ranks for normal stress indicates a greater effect of linear position when contrastive stress is not present to moderate the observed tendency to regard the agent as the most important term in active sentences.

The analysis of variance for the direct object rankings is shown in Table D-3. Voice and dative position both had highly significant ($p<.001$) effects. This is reasonable, since both passivization and dative movement affect the position of the direct object relative to the other sentence constituents. Contrastive stress also had a highly significant ($p<.001$) effect. There is some indication, in the barely significant ($p<.05$) VxC interaction, of relatively greater differences in the mean ranks for the normal stress case, as compared to the contrastively stressed cases. In particular, the direct object in first position in the P/B/N form is rated as more important than would be predicted on the basis of the other sentence types. This parallels the effect observed for the agent in active sentences and shows the primacy attached to the first NP in sentences with normal stress.

The results of the indirect object rankings are summarized in Table D-4. Voice, dative position, and contrastive stress all had highly significant ($p<.001$) effects, as in the direct object results. One highly significant ($p<.001$) interaction, DPxC, was also present. This is implicit in the lack of parallelism in Figure D-2. As in the case of the direct object and the agent, the sentences with normal stress result in larger differences in the indirect object rankings. Thus, position is consistently a relatively more prominent focus variable in the absence of the competing device of contrastive stress.

Two additional analyses of variance were carried out, on the data from the active sentences only, to check the effect of dative position on the Ss' rankings of the direct and indirect objects. This was done in order to determine whether the significant effect of dative position found in the main ANOVA calculations was due only to the object NP being shifted to the first position in the sentence, which occurs in the passive sentences.

Dative position was found to have a highly significant ($p<.001$) effect on the Ss' rankings of both the direct object and the indirect object, for the active sentences. The results indicated further that the second NP in active sentences is in fact regarded as more important than the third NP.

A Comparison of the Focus Devices

Front-shifting (by passivization or dative shift) and contrastive stress are identified by the experimental results as two effective focus mechanisms. A measure of their relative strength is available from Table C-5 for those sentence types in which a split in strategy occurred. When the second or third noun is stressed, the first noun is assigned rank 1 by an average of 41% of the Ss, while 39% choose the stressed noun. Thus, the first position noun and the stressed noun are chosen equally often as the most important element for these sentence types.

A second, more general, measure is the mean rank assigned to the first, second, and third nouns in both the unstressed and stressed cases. These mean ranks, which are graphed in Figure D-3, were computed from the results of the standard ANOVA (Table D-5). Figure D-3 illustrates the amount of the change in importance that is brought about by stressing a noun in a given position, or by altering its position. It does not represent the rank profile that would be expected for all three nouns in any one sentence. It can be seen from Figure D-3 that contrastive stress has a larger effect the further back the stressed NP is located; initial NP's are already emphasized by their position.

Table D-5 also provides some data concerning the relative distribution of importance in active and passive sentences. For the normal stress situation, the mean rank for the grammatical subject in the active (i.e., the agent) is 1.68, while for the passive (i.e., the direct or indirect object), it is 1.57. The corresponding mean ranks for the two grammatical objects is 2.96 for the active and 2.94 for the passive. Thus the active and passive sentences show roughly the same relative importance of the subject and objects. Since passivization does not make the grammatical subject more prominent relative to the grammatical objects, the passive sentence form cannot be said to be "marked" in this sense.

Subject Groupings

As mentioned previously, the standard ANOVA technique would be inappropriate if any significant Ss-by-treatment interaction showed radically different response patterns. Fortunately, the hierarchical clustering analysis (Veldman, 1967, p. 308) revealed that such patterns were not present in the data. In addition, this subject grouping technique is of interest because it provides a rough indication of the percentage of Ss who responded to each of the different experimental focus devices, for each of the words which the

Ss ranked.

In order to investigate, for example, the effect of voice on the Ss' rankings of the agent, the scores which the Ss assigned to the agent in each of the twenty sentence types were used. They were standardized within each S, since it is not the absolute score assigned to the agent, but rather the sensitivity of the S to the various focus devices that is of interest. These twenty scores were then reduced to two scores -- the average standardized rank that the S assigned to the active sentences, and to the passive sentences. The hierarchical clustering program then grouped the Ss according to the similarity of their score profiles. The program minimizes the increase in total within-groups variation at each step as it combines groups of Ss. The number of groups of Ss which may be said to differ in score profiles is determined by graphing the error index, and choosing the number of groups at the point preceding a relatively large increase in the error function (Veldman, 1967, p. 311).

When the group profiles are graphed, it can be seen that crossover patterns do not occur, in general. Thus, the hierarchical clustering technique groups the Ss according to the extent of their response to voice, dative position, or stress change. Different groups of Ss do not respond in opposite ways to the same focus device; rather, they simply show differing degrees of sensitivity to the focus device.

The exception to this general finding occurred for contrastive stress, where slight crossover patterns were observed. As many as nine Ss reacted in the opposite way to stress; that is, nine people considered the verb to be less important when stressed than when the sentence had no contrastive stress. Similarly, five people reacted in this way to stress on the agent, and five others -- not the same Ss -- to stress on the direct object. Three Ss showed this unusual response to stress in ranking the indirect object. The extent of this qualitative difference in S responses is slight, and should not affect the validity of interpreting the standard ANOVA results.

In general, it is difficult to classify the Ss as sensitive or not sensitive to a particular focus device, since the grouping technique did not reveal qualitative differences in S profiles, but rather a range of quantitative differences. For the relevant focus devices (dative position, voice, and stress for the direct and indirect objects, voice and stress for the agent, and stress for the verb) the clustering technique showed that 25% to 42% of the Ss were only slightly responsive to the focus device, while all the others were more strongly influenced by it.

Second and Third Task Results

The results of the second and third tasks will require only a brief discussion, since they are highly consistent with the first task results. As in the preceding discussion, the results of the ranked data analysis are presented first, followed by the standard ANOVA results.

Analysis for Ranked Data

In the second task, the Ss were asked to rank order the six pairs of words formed from the three nouns and the verb. Tables E-1 and E-2 summarize the data. The Friedman test for difference in mean ranks produced the chi-square values, given in Table E-3, which indicate the significance of differences in importance of the six pairs of words. These chi-square values are all highly significant ($p<.01$). Also shown in Table E-3 are the average intercorrelations between Ss for each of the twenty sentence types. These r' values range from .16 to .45. Ten of the r' values are highly ($p<.01$) significant; half of the sentence types resulted in significant inter-subject reliability in the rankings.

As in the first task, the highly significant r' values generally were obtained for the sentence types in which contrastive stress occurred on the first or second element. Further, as in the first task, lower r' values occurred when the third or fourth element was contrastively stressed.

The average intercorrelations are low, as was the case in the first task analysis. In order to try to extract the most reliable data, the data for the first rank only, expressed in percent form in Table E-4, will be considered next.

In Table E-4, the number in each cell represents the percentage of the *S*s who assigned the first rank to a given pair under a given stress condition. The NP's are specified in this table by their position in the sentence, rather than as agent, direct object, or indirect object. Two results are noteworthy here. First, rank 1 was assigned to a noun-verb pair on the average by 72% of the *S*s, while 28% chose a noun-noun pair as being the most important. Secondly, the pair consisting of the first noun (grammatical subject) and the verb (V-N^1) was especially prominent. Thus, the split in *S* strategies which occurred in the first task when the second or third noun was stressed, did not occur here. From the first task results, one would predict that when the second noun is stressed, the *S*s would choose as the most important pair V-N^2 as often as they chose V-N^1. However, V-N^1 was chosen twice as often as V-N^2. Thus, contrastive stress is not as powerful as front-shifting when judged in the second task.

The data summary for the third task is given in Tables F-1 and F-2. The *S*s were asked to rank order the four triples of words, as specified in the first column of Tables

F-1 and F-2, according to their importance to the meaning of the sentence.

This task appeared to be less meaningful for the *S*s, measured by the lower chi-square and average inter-correlation statistics (Table F-3). For five of the sentences, the chi-square value was not significant at the .01 level; for these sentences the *S*s did not discern significant differences in importance among the four triples of words. Further, only six r' values were significant ($p<.05$). Thus the inter-subject level of agreement was low. The trends for the assignment of first rank, however, are not surprising. The most frequently chosen triple is V-N^1-N^2, and its stress variants.

ANOVA Results

For the second task data, this analysis clearly indicates the above-mentioned prominence of verb-noun pairs. They were assigned an average rank overall of 3.0, as compared to a mean rank of 4.0 for the noun-noun pairs. The ANOVA fits in well with the results of the first task concerning the significance of the main effects. Contrastive stress was highly significant ($p<.001$) for all pairs except verb - indirect object ($p<.05$). However, F-ratios for stress were smaller than in the first task, and much smaller than voice and dative position F-ratios. This finding agrees with the observation from the ranked data analysis that stress is not as powerful as front-shifting when judged according to this task. Voice was highly significant ($p<.001$) for the verb-noun pairs. This is not surprising, since the noun in each pair is sensitive to voice change in the first task. Dative position was highly significant ($p<.001$) for the verb - direct object and verb - indirect object pairs. This result would be predicted from the first task, since the direct and indirect objects are sensitive to dative movement.

Voice was barely significant ($p<.05$) for the agent - direct object and agent - indirect object pairs. The voice change which enhances the agent decreases the importance of the objects, and vice versa. Thus, for the agent-object pairs, the effect of voice almost cancels out. Also of interest for these two pairs is the result that dative movement was not significant. The first task would predict significance, since the two objects are sensitive to dative position, and the agent is not. The apparent anomaly is clarified by the nature of the significant ($p<.001$) VxDP interaction for both pairs. This interaction and its related main effects are graphed in Figure G-1 for the agent - indirect object pair. The crossover pattern can be explained by taking into account the distance between the two members of the pair. For the active/back and passive/forward sentence types, the agent and indirect object are separated only by the verb, but for the active/forward and passive/back sentences, the two nouns are at opposite ends of the sentence, which reduces their importance as a pair.

The same distance effect is seen, though less clearly, in the verb-object pairs. The VxDP interaction for the verb - indirect object pair can be inferred from Figure G-2. Both passivization and dative movement increase the importance of the pair, and no cross-over pattern occurs. The slope for the active sentences shows the distance effect, since in the active/back type, the verb and indirect object are separated by another noun. The smaller slope of the passive sentences reflects the absence of the distance effect; in both kinds of passive sentence, the verb and indirect object are juxtaposed.

Finally, for the direct object - indirect object pair, voice was significant ($p<.01$), which is expected since a voice change affects the importance of both objects in the same direction. Thus, the second task ANOVA results are all predictable from the first task ANOVA, except for an added "distance effect."

Even though the ranked data analysis suggested that the third task was less meaningful than the others, the pattern of significance of the main effects as shown by the standard ANOVA agrees well with the first task results. Contrastive stress was highly significant for all four triples ($p<.001$). The observed voice and dative position results can be predicted from the first task. If a single noun is sensitive to voice or dative position, then the triple which leaves out that noun is sensitive to that focus device. Thus, voice is significant ($p<.001$) for all but the agent - direct object - indirect object triple, since it is significant in the first task for all but the verb. In other words, a focus device which makes one element in the sentence more important, makes the other three elements as a triple less important, and vice versa.

The three tasks resulted in highly consistent assessments of the significance of the treatment effects. This result is encouraging, since it provides evidence that the effects of stress, passivization, and dative movement are prominent and stable.

The above results have been reported and interpreted largely independently of the existing theories. In the following chapter, the impact of these findings on theoretical accounts of focus is considered.

CHAPTER SEVEN

DISCUSSION

Relevance of Experimentation

In discussing the implications which the experimental findings have for the theories of TGG, it is necessary to summarize briefly some of the goals of the theories. Three aspects of TGG are discussed below.

First, theories of TGG attempt to reflect the language competence of the individual. In the earlier theories, the notion of competence was viewed as independent of language use. However, the domain of TGG theories has recently been expanded to the point where the theories can be held accountable for "knowledge of language use." Discussion of such areas as discourse is now regarded as a necessary part of an adequate competence theory. The expanded notion of competence thus provides a framework for discussion of the semantic significance of focus variables, which had previously been regarded as stylistic or performance factors.

Thus, some grammars now attempt to reflect the idealized speaker-hearer's knowledge regarding the relative semantic prominence of different sentence constituents. Such competence is seen to consist of two facets --

knowledge of the basic structure of an utterance with respect to focus, represented in the grammar by an underlying structure, and knowledge of the interrelationships which exist among sentences differing with respect to focus, expressed in the grammar by optional transformations. That is, the grammar assigns syntactic correlates to the idealized language user's knowledge about focus.

Experimentation, of course, does not sample such knowledge directly, but rather explores the use of language. The same is true of linguists' intuitions. However, the theories of focus, or of "knowledge of language use" in general, must be responsible to the objectively measured native speaker judgments which are provided by experiments. Performance factors can be expected to alter individual judgments somewhat. However, the results for a large group of subjects, in a simple experimental task which is free of memory and production variables, should reflect the main aspects of their knowledge about focus. It would be difficult to insist that a theory is correct if the subjects as a group consistently behave in a manner favoring a radically different prediction from that of the theory. Slight quantitative differences between behavior and the theory's prediction would be less damaging to the theory.

A second area of TGG, in which it is more difficult for experimental results to make inroads, concerns the language user. Language users, the subjects in psycholinguistic experiments, may differ in their ability to use their language competence, and the theories claim not to be responsible to that variable. Language competence itself is assumed not to vary from person to person. An important reason for the failure of most theories even to consider variability among language users is no doubt the nature of the data-base which is commonly employed to test the theories. This data-base has generally consisted of the intuitions of the linguist himself. Experimental work, by expanding the data-base, and by minimizing the competing ability variables, such as those involved in memory and production, has indicated that the grammar must describe, not simply the individual's competence, but rather a considerable variation in competence (Gleitman & Gleitman, 1970; Fletcher, 1973).

Transformational generative grammars are product grammars; this is a third way in which the goals of the theory are restricted. Thus, the grammatical models attempt to mimic language competence by expressing, in the transformational component, relations of various strengths among the sentences of the language. The transformations are not expected to reveal or reflect the process by which the sentence was produced.

It was anticipated that the present experimental inquiry might point out theoretical shortcomings in two of the three areas discussed above. First, the experimental results might indicate some aspects of focus which have not yet been incorporated into the theoretical models. Secondly, the assumption that all language users have the same competence is investigated through the use of a broader data-base than the individual linguist's intuitions. The present experiment, then, represents an attempt to identify the focus variables and the variation in language user competence which an adequate product grammar must describe.

Implications for Linguistic Theory

Passivization

First, passivization was found to cause a shift in relative prominence of the agent, patient (direct object), and beneficiary (indirect object), for the experimental sentences. A syntactic correlate of this focus effect was a change in the order of the noun phrases. The experimental results, then, have identified a semantically significant aspect of passivization. An adequate product grammar must reflect this semantic property. Chambers (1970) and Chafe (1970) both regarded passivization as a focus device. However, Chomsky (1971) and Jackendoff (1972) did not consider passivization from a focus standpoint.

Secondly, the results of this experiment indicate that front-shifting may be the basic focus mechanism of passivization. Thus, the first noun phrase in the sentence tends to be more prominent than later noun phrases. This general finding fits in with Chambers' grammatical model, in which the first noun phrase is the topic of any sentence, where [+TOPIC] is a marker which indicates increased importance. This particular aspect of Chambers' model appears to have been motivated partly by psycholinguistic experiments, such as that of Tannenbaum and Williams (1968) concerning focus of attention. Chambers' grammatical theory, in fact, is the only one discussed here which shows evidence of being influenced by experimental results.

According to Chafe, however, passivization should focus the agent. Chafe's theory, despite his concern with semantic context, is based primarily on sentences considered in isolation. In his model, word order is not considered independently of intonation. Thus, intonational prominence is the only syntactic reflex of focus. Further, high pitch and intensity denote new information, which is always prominent. However, the experimental results do not support Chafe's model; intonational prominence alone is insufficient to account for the relative importance of words in the sentence.

Markedness

A third point of interest concerning passivization is that the subjects of the active sentences were as prominent as the subjects of the passive sentences, as indicated by a mean assigned rank of 1.68 for the active, and 1.57 for the passive. Thus a grammatical model in which the subject of a passive sentence is marked for focus while the subject of an active sentence is not, would be somewhat misleading.

Markedness is usually discussed theoretically in vague terms. The assertion that a particular sentence form is "marked" or "unmarked" with respect to focus is uninformative. Marking may be considered to be a formal device to trigger one sentence form rather than another. Sometimes, though, the theoretical models hint that markedness is a reflection of some semantic property. Thus, in Chambers' model, marking with respect to focus means that the marked word is more focused than usual. The implication is that the choice of which sentence of a pair is marked and which is unmarked is not arbitrary. However, just what does "more focused" mean? Does it mean that the focused word stands out more in its sentence than does any word in the corresponding unmarked sentence? Does the unmarked sentence indicate the normal distribution of semantic prominence for the first, second, and third noun phrases, or alternatively for the agent, patient, and beneficiary? Or does the unmarked form simply indicate the more common sentence type of the two; if so, more common, based on what corpus of data? Without some indication of how the marked and unmarked forms differ, markedness is not subject to empirical testing.

The experimental data reported here can be useful in evaluating a more specific notion of markedness, such as the one proposed by Johnson-Laird (1968b, p. 7):

> ...the passive implies that the logical object is more important than the logical subject, whereas the active implies that there is a minimal difference in the importance of these two entities.

For the active sentences here, the grammatical subject received a mean rank of 1.68, while the two objects received a mean rank of 2.96. The passive sentences yielded corresponding ranks of 1.57 and 2.94 for the grammatical subject and objects respectively. Johnson-Laird's hypothesis does not reflect these experimental results. In fact, the active and passive sentences show similar distributions of semantic prominence for the grammatical subject and objects, or for the first, second, and third noun phrases in the sentence. While passivization does interchange the mean ranks assigned to the agent and the front-shifted object, it does not alter the distribution of importance for the surface structure constituents. Thus, when the direct object becomes the surface subject by passivization, it is not more prominent than the agent as surface subject in the corresponding active form.

The present results suggest, then, that corresponding active and passive sentence pairs should be thought of as focus variants with equal focus status, so that markedness in this sense may be a specious notion. Passivization, then, should be thought of as altering the pattern of importance of the words in the sentence, rather than as introducing additional importance. Thus, the theoretical use of the marked/unmarked distinction for sentences with normal intonation, in the sense of an unmarked sentence being colorless or unemphatic, is misleading in this respect. In each of the experimental sentences with normal intonation, both active and passive, the first NP was shown to be focused.

Dative Movement

The second main effect shown by the experimental results is that dative position is semantically significant with respect to focus. Chomsky (1971, p. 203) has argued for the significance of dative position, since sentences which vary only with respect to the dative transformation "differ in the range of possible focus and presupposition in the way predicted by the position of the intonation center." This statement may be taken to mean that the indirect object is focused by placing it in the intonation centre of the sentence. Chambers (1970) incorporated this more specific idea into his grammatical model; the indirect object is emphasized when it is back-shifted to the intonation centre.

Chafe (1970), however, considered dative position to be semantically insignificant for active sentences. In Chafe's framework, only transformations which alter the distribution of old and new information are significant from a focus standpoint. Dative movement in active sentences simply exchanges the position of two predicate noun phrases, both of which are seen as conveying new information. Chafe's theory, then, cannot accommodate the present experimental results regarding dative position.

An interesting result concerns the focus mechanism of dative movement. It is the front-shifted noun phrase that is prominent, not the noun phrase that is back-shifted to the intonation centre of the sentence. This finding shows up a weakness in the technique of building and testing theories solely by introspection, since the theories discussed here all predict either that dative movement is not significant, or that it brings a noun phrase into focus by back-shifting it to the intonation centre. The latter option, in fact, is theoretically awkward in a grammar which views passivization as a focus device. Chambers, for example, emphasized the similarity of passivization and dative movement in shifting NP's; partly on this basis he justified his treatment of dative movement as a semantically significant device. However, having stated that the two transformations are similar, he then developed a theory in which they work quite differently. The indirect object, placed in the intonation centre by dative movement, is emphasized. The agent, placed in the intonation centre by passivization, is not emphasized. Secondly, dative movement is needed in addition to passivization in Chambers' theory in order to generate the surface structure "The book was given to Andrew by John." In order to trigger dative movement, "Andrew" must be marked [+FOCUS], but this marking is not realized at the surface level as movement to the intonation centre. Thus, the focus properties of sentences which result from the application of both passivization and dative movement are not clear.

The transformational theories of Chomsky (1971), Chambers (1970), Chafe (1970), and Jackendoff (1972) are all inadequate in reflecting the experimental results concerning the semantic significance of dative movement. The results regarding voice and dative position indicate a strong relation between linear order of constituents and their importance to the meaning of the sentence (Fig. D-3). A theory such as Chambers', which treats front-shifting and back-shifting as similar focus phenomena of about equal impact, would predict an inverted V shape for the top line of Fig. D-3. Similarly, a theory such as Chomsky's or Chafe's, which addresses the question of focus strictly in terms of intonation, would incorrectly predict the shape of Fig. D-3.

The results, of course, did not indicate that intonation is irrelevant to the matter of focus. The shape of the top line of Fig. D-3 reflects the effects of the order-changing transformations on the prominence of the noun phrases in the sentence. The results suggest that passivization and dative movement are semantically significant as focus devices but that this syntactic reflex of focus is independent of intonation considerations. Both of the transformations work in the same way; they increase the prominence of an element by front-shifting it. Further, the results indicate that the passive sentence is not "more focused" than the active sentence, since the relative prominence of the grammatical subject as opposed to the objects is not increased by passivization.

Contrastive Stress

The experimental results also showed that putting contrastive stress on a word, realized as a change in intonation involving increased pitch and intensity, increased the importance of that word. Jackendoff (1972) and Chomsky (1971) did not discuss focus in terms of semantic prominence; however, they did predict that a contrastively stressed element is the focused item in a sentence. Chafe's theory (1970), using the concept of old and new information, does reflect the observed semantic prominence of a contrastively stressed element. Chambers (1970) also described the focus effect of contrastive stress, signalled by a syntactic marker. The three syntax-based theories -- Chambers', Chomsky's, and Jackendoff's -- encounter considerable difficulty in attempting to express contrastive stress in syntactic terms because, as Bolinger (1972) noted, the position of the contrastive intonation centre is not predictable from the syntax. In this sense, these theories cannot be considered to provide an adequate treatment of contrastive stress.

Chomsky, Jackendoff, and Chafe all described the focus properties of sentences solely in terms of intonation. Each of these theories shows the influence of Halliday's notion of information focus, which represents only part of Halliday's theory of focus. A further point concerning the above TGG theories is that they all consider the intonationally prominent item, even in sentences with normal intonation, to represent new information. Thus, these theories, which treat focus as an intonation phenomenon, involve a framework of old and new information, or presupposition and focus. This general framework appears to have been influenced by Halliday's concept of information structure. Further, all of these theories indicate that the new information in the sentence, which is intonationally prominent, is also semantically prominent.

The present experiment was not designed to indicate which elements in a sentence represent old information and which represent new information. The experimental task did, however, provide a measure of the relative semantic importance of some of the sentence items. Thus, the adequacy of a theory of focus which is restricted to intonation properties can be examined by means of the experimental results, although the usefulness of the framework of old and new information cannot be determined using the present experimental technique.

Within Chafe's concept of old and new information, new information is enhanced if it is a phrase containing the intonation centre. The experimental results support the view that the NP in the intonation centre is semantically prominent, but only if the intonation is contrastive. The prominence pattern which the theories predict for sentences with normal intonation is therefore not backed up by the data. Halliday too predicted that in cases of normal intonation, the later NP's in the sentence would be prominent because of intonation (1968, p. 213):

> Thus the nearer an item is to the end of the clause the more probable it is that that item will carry prominence as informationally 'new'.

Thus the theories of focus which are based on the view that the intonation centre conveys prominence have been inaccurate in describing cases of normal intonation, although they do reflect the increase in prominence which is brought about by contrastive stress. The concept of given and new information, or presupposition and focus, as developed in various theories, appears to be a plausible semantic basis for the observed experimental effect of contrastive stress. However, the "given-new" construct does not lead to an accurate description of the observed prominence pattern in sentences with normal intonation, since the experimental results indicate that the item in the normal intonation centre is not semantically prominent.

An interesting result emerges from the comparison of the relative impact of contrastive stress and front-shifting as focus devices. As shown in Fig. D-3, the data indicate that contrastive stress is not a more powerful focus device than front-shifting; rather, the two processes simply represent different ways of focusing information. This result indicates that a theory of focus which is based solely on intonation is inadequate, since such an approach would ignore front-shifting, an equally powerful device.

Toward an Adequate Theory of Focus

The experimental results indicate that the grammar must describe the focus effect of front-shifting a noun phrase, whether by passivization or by dative movement. Chambers (1970) and Halliday (1967-68) both recognized the prominence of the first NP in sentences of the kind which have been investigated here. Both theories postulated a second semantic basis for focus, realized at the sentence level independently of intonation. Although this second concept enabled both theories to describe the focus effect of passivization, neither theory correctly describes the change in prominence pattern which is brought about by changes in dative position.

The data, then, favor an approach, such as Chambers' or Halliday's, in which a word order factor operates independently of an intonation factor in determining the pattern of prominence of the words in a sentence. Chambers' proposal can be regarded as an attempt to state a Halliday kind of focus theory in terms of TGG. Some of the shortcomings of Chambers' theory, which were discussed in Chapter Two, may thus be reflections of the problems of TGG in accommodating an adequate theory of focus. Thus the data reported here raise two interesting questions. First, can Halliday's theory be amended in order to accommodate the experimental facts? Secondly, what would be the difficulties involved in incorporating such a theory into the TGG framework?

The experimental results generally support Halliday's basic concept of dividing a discourse grammar into information structure, involving intonation, and thematization, involving word order. However, the results also point out two shortcomings in Halliday's approach. First, as mentioned previously, Halliday stated (1968, p. 213) that the clause-final item, even under normal intonation, carries prominence because it is informationally "new." The data, however, showed that the clause-final item was the least prominent, even though it contained the intonation centre of the clause. This aspect of Halliday's theory can be made consistent with the experimental findings by the addition of the statement that for sentences of the experimental type at least, the occurrence of unmarked focus with normal intonation does not reflect increased prominence of the final lexical item. This change in Halliday's theory is a minor one, since nothing else in his theory seems to depend on new information being prominent.

Secondly, Halliday's theory does not reflect the relation, illustrated in Fig. D-3, between the importance of a word and its linear order in the clause. Word order as a realization of semantic properties is treated in the area of thematization in Halliday's theory. However, according to his theory, semantic prominence of a constituent can be realized by word order only if the constituent is the theme, which is usually the first NP of the clause. This concept would need considerable revision in order to accommodate the experimental results concerning dative position, which indicated that the second NP in a sentence is seen as more important than the third NP.

The discord between theory and experimental results could perhaps be resolved through the use of Halliday's concept of information units. If a clause can reliably be divided into information units, and if in fact the experimental sentences were each composed of two or more such units, then the prominence of the front-shifted dative NP might be explained in these terms. A statement concerning the relative importance of the points of information focus in the linear sequence of information units would also be necessary in order to incorporate the observed order effect into Halliday's theory.

Toward an Adequate TGG Theory of Focus

The possibility of expressing Halliday's theory in a TGG framework is an interesting one. Attempts have already been made to incorporate the information structure part of his theory into the interpretive semantics models of Chomsky (1971) and Jackendoff (1972). The intonation centre concept of focus has caused the grammarians some difficulty, because contrastive stress is not easily discussed in a syntax-based theory. This difficulty is most clearly seen in attempts, such as Chambers', to express contrastive stress as a syntactic phenomenon similar, for example, to clefted structures. As discussed earlier, the intonation centre view of focus is inaccurate in cases which do not involve contrastive stress. Thus Chomsky's theory tends to be incorrect, since he applied the Halliday concept of focus mainly to sentences with normal intonation, the very sentences for which it fails. Jackendoff did not avoid discussing contrastive stress; he postulated an arbitrary surface level focus marker F to indicate, in the presence of contrastive as well as normal stress, which surface constituent is the focus of the sentence. Jackendoff pointed out that surface structure constituents which can be focused may not be constituents at the deep structure level. This observation indicates a further difficulty in attempting to incorporate a theory of focus into the Standard Theory Model, as Chambers did, since such an attempt requires focus to be specified at the deep structure level.

One of the basic concepts in Halliday's theory is that of "information unit," which is realized as a tone group. The present experimental data do not require this theoretical construct, but the concept may prove useful in understanding the distribution of given and new information in a sentence. If the concept does prove to be required in an adequate theory of focus, then it too would have to be expressed in TGG terms. This would present a problem for a syntax-based theory, since information structure is viewed as independent of constituent structure (Halliday, 1967, p. 200):

> The speaker is free to decide where each information unit begins and ends, and how it is organized internally; this is not determined for him by the constituent structure.

A syntax-based grammar, then, in attempting to incorporate Halliday's focus theory, would have difficulties with the concept of information unit in addition to the present difficulties with contrastive stress.

Thus it seems that a semantics-based grammar, perhaps one which reflects Chafe's general goals, could more readily assimilate a focus theory. Chafe's own grammar was inadequate in this respect, as the present experimental data indicate. However, Chafe simplified Halliday's theory considerably; for example, he attemped to correlate both intonation and word order phenomena with the distribution of old and new information. Thus, his theory does not express front-shifting as a focus device. However, his theoretical framework does not seem to preclude the possiblility of considering word order prominence patterns independently of intonation. At present, then, it seems that Halliday's type of focus theory is the most promising; and a semantics-based grammar seems the most likely place in which such a theory might find its formal statement in TGG terms.

The Role of Experiments

It must be kept in mind that the effects reported here have been demonstrated only for sentences of the form "John gave the book to Andrew," and its voice, dative position, and stress variants. Other variations in the sentences might alter the results. For example, the linear order effect might disappear in longer sentences, where first and last elements might assume importance. Such a result would call into question the idea that the focus effect of dative movement can be expressed as front-shifting. Knowing whether the present correspondence between linear order and relative prominence persists is crucial in determining the extent to which Halliday's thematization theory must be revised.

Secondly, all the agents and indirect objects in the experimental sentences were proper nouns, while all the direct objects were definite noun phrases. This restriction may not have affected the classification of the various focus mechanisms. However, variation in the noun phrases must be investigated as part of the question of the semantic basis for focusing, especially if the theoretical models maintain an orientation of given and new information. It may well be, for example, that the stronger syntactic correlates of old and new information occur at the noun phrase level rather than the sentence level. Thus, definite noun phrases and pronouns might correlate highly with old information, while proper nouns and indefinite noun phrases might correlate with new information. Experimental support for this hypothesis has recently been reported by Grieve (1973).

Further, the mechanisms for focusing sentence elements other than nouns and verbs must also be investigated experimentally. Such experimental work might be able to shed some light on the question of the need for the concept of information unit in an adequate theory of focus.

Summary

In the introductory chapters of this study, some accounts of focus which have been expressed within a TGG framework were presented. A three-way distinction in the use of the term semantics was proposed; within this framework of Sc, St, and Sd, the various notions of meaning equivalence, as adopted by different TGG models, were discussed. The ability of a TGG theory to include an adequate theory of focus is considered to depend on the notion of meaning equivalence which that theory adopts, and further, on whether Sd phenomena are seen as less significant than Sc or St phenomena. Recently, theories of focus have been expressed within the Standard Theory Model (Chambers, 1970), the extended Standard Theory Model (Chomsky, 1971; Jackendoff, 1972), and a semantics-based model (Chafe, 1970). In addition, Lakoff (1971) has indicated that the generative semantics framework is able to accommodate a theory of focus. Such an attempt, however, has not yet been made, and so could not be evaluated in the present study.

In the interpretive semantics model, focus concepts were not considered until notions such as the full specification of meaning at the deep structure level were well established. This may help explain the difficulty which the extended Standard Theory Model has in accommodating a focus theory -- much theoretical structure has been built up, on other grounds, with which any focus theory will be required to blend. The meaning-based models, however, have attempted to abandon some of the earlier syntax-based notions. Thus, they have the possibility of being less resistant to the changes which are necessary in order to accommodate a focus theory. They are also less complete, however, so that their exact capacity for incorporating focus variables is not easy to establish.

In the present experimental study, subjects were asked for direct judgments of the importance of words in a set of twenty sentences which varied systematically according to voice, dative position, and location of contrastive stress. These three sentence properties were considered to have possible focus roles. The results indicated that front-shifting, as occurs in passivization or dative movement, is a focus device, as is contrastive stress. These results are not presently accommodated in any of the TGG theories under discussion. However, Halliday's account of focus, which has not been expressed in TGG terms, was found to reflect the present experimental results better than the current TGG theories. Two areas of Halliday's theory which would require modification to accommodate the results were outlined here, as were some areas of possible difficulty in expressing such a theory within the framework of current models of TGG.

The role of psycholinguistic experimentation in the development of an adequate theory of focus is considered here to be of primary importance. The present experiment represents only a step toward a thorough investigation of focus. Only by taking into account the results of a wide range of experiments can a grammatical theory be expected to avoid the shortcomings of the current intuition-based models.

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APPENDIX A
EXPERIMENTAL SENTENCES IN PRESENTATION ORDER

0. Susan gave the GIRL a toy. (practice sentence)
1. The BOOK was given to Andrew by John.
2. Peter HANDED the flashlight to George.
3. JOANNE sent Barb the picture.
4. The magazine was offered to Betty by Jill.
5. GEORGE was handed the flashlight by peter.
6. John gave the book to ANDREW.
7. The picture was sent to Barb by JOANNE.
8. JILL offered the magazine to Betty.
9. George was handed the flashlight by Peter.
10. Joanne sent the PICTURE to Barb.
11. John GAVE Andrew the book.
12. Betty was offered the magazine by JILL.
13. Joanne sent Barb the picture.
14. Andrew was given the BOOK by John.
15. The flashlight was handed to GEORGE by Peter.
16. Jill offered BETTY the magazine.
17. Barb was SENT the picture by Joanne.
18. John gave the book to Andrew.
19. The magazine was OFFERED to Betty by Jill.
20. Peter handed George the FLASHLIGHT.

APPENDIX B
SUBJECT INSTRUCTIONS

In this experiment, I want to investigate the relative importance of words and of pairs of words in conveying the meaning of sentences. Some words are more important than others to the meaning of the sentence, and some pairs of words are more closely related than others in a particular sentence to convey its meaning.

The sentences you will hear on tape have varying word patterns and also varying stress patterns, because speakers of English convey information by using these methods. Please attend carefully to the _way_ in which the sentence is presented on the tape, since this may be important for the _meaning_ of the sentence, and you are interested primarily in the meaning of the sentences.

Some of the sentences may sound odd to you, because they are spoken in isolation, rather than in the natural context of a conversation. For this experiment, it was necessary to have isolated sentences, but please keep in mind that each of these sentences could occur in a natural English conversation, given an appropriate context. Throughout the three parts of the experiment, please keep in mind that I am interested in what _you_ think about these sentences. Your first impressions about them are especially valuable.

Please turn to the first page of your booklet, with the practice sentence on it. Each page of your booklet contains a sentence similar to this one. Below the sentence there is a list of the four basic words from the sentence, with a square beside each word. Each sentence will be presented three times on the tape. Except for the practice sentence, I want you to hear each sentence before you read it. So, please listen to the sentence at least once before you turn the page. Listen carefully as the sentence is presented on the tape three times. Then, rank order the four words according to their importance to the meaning of the sentence. First pick the word that is most important, and place a 1 in the square beside it. Then pick the second most important word and put a 2 in its square, and so on. Base your decisions on the way the sentence is presented on the tape. Your experimenter will stop the tape after the practice sentence, to answer any questions you might have. Please glance up from your booklet when you complete each sentence so that the experimenter will know when to give the next one.

--First Experimental Task--

The second part of the experiment is similar to the first, except that you will be considering the words in pairs. Some pairs of words are more closely related than others to convey the central meaning of the sentence.

Please turn to the first page of your booklet. The row of words and the column of words form a matrix, and each square in the triangular pattern indicates a pair of words. For example, on the card that your experimenter has, the square marked with a 1 indicates the pair gave/girl, while the pair marked 2 is the pair Susan/toy.

As in the first experiment, listen to the sentence on tape at least once before you turn the page. Listen to the sentence on tape again, and pick the pair of words which goes together best to convey the meaning of the sentence. Put a 1 in the square which indicates this pair. Continue to rank the pairs 1 through 6.

Your experimenter will stop the tape after the practice sentence to answer your questions.

--Second Experimental Task--

In the last part of the experiment, you will be considering the words in groups of three. Some groups of words are more closely related than others to convey the central meaning of the sentence.

Please turn to the practi[illegible] sentence. The sentence is written four times, with a square beside each repetition of the sentence. In each repetition, three of the words are circled. Your task is to decide wich group of circled words is most closely related to the central meaning of the sentence. Put a 1 in the square beside the sentence which has the most important group of words circled. Then pick the group of words which is next most closely related to the central meaning of the sentence, and put a 2 in its square, and so on.

As before, please listen to the sentence at least once before turning the page.

Your experimenter will stop the tape after the practice sentence to answer your questions.

--Third Experimental Task--

APPENDIX C
FIRST TASK RESULTS

TABLE C-1

DISTRIBUTION OF RANKS: ACTIVE SENTENCES

Item Ranked	Rank	Active/Back N	V	G	D	I	Active/Forward N	V	G	D	I
Verb	1	14	45	13	13	11	13	52	9	8	13
	2	36	17	26	18	24	34	15	28	29	33
	3	17	8	20	24	19	14	6	18	18	19
	4	12	9	20	24	25	18	6	24	24	14
Agent	1	55	28	61	31	33	46	23	68	43	29
	2	11	28	6	21	13	9	35	3	11	22
	3	7	13	7	19	18	16	12	3	16	13
	4	6	10	5	8	15	8	9	5	9	15
Direct Object	1	7	6	5	35	9	8	2	2	23	2
	2	24	31	38	27	30	17	12	17	11	10
	3	37	36	27	12	27	22	24	32	26	32
	4	11	6	9	5	13	32	41	28	19	35
Indirect Object	1	3	0	0	0	26	12	2	0	5	35
	2	8	3	9	13	12	19	17	31	28	14
	3	18	22	25	24	15	27	37	26	19	15
	4	50	54	45	42	26	21	23	22	27	15

In the tables throughout the appendix section, when column or row headings must be abbreviated, the following meanings are intended:

Sentence Voice: A = active
P = passive

Dative Position: B = back (indirect object after direct object)
F = forward (indirect object in front of direct object)

Stress Location: N = no contrastive stress
V = contrastive stress on verb
G = contrastive stress on agent
D = contrastive stress on direct object
I = contrastive stress on indirect object

TABLE C-2

DISTRIBUTION OF RANKS: PASSIVE SENTENCES

Item Ranked	Rank	Passive/Back N	V	G	D	I	Passive/Forward N	V	G	D	I
Verb	1	18	39	7	7	10	9	47	12	7	10
	2	31	26	22	27	24	27	16	30	31	28
	3	9	8	20	19	28	23	6	22	25	24
	4	21	6	30	26	17	20	10	15	16	17
Agent	1	6	6	27	1	4	6	10	32	6	3
	2	5	5	13	7	9	13	9	9	11	6
	3	22	18	16	35	15	17	14	10	19	19
	4	46	50	23	36	51	43	46	28	43	51
Direct Object	1	52	29	36	66	36	12	4	11	39	5
	2	17	21	23	7	20	32	28	21	19	39
	3	8	13	15	4	18	23	31	26	15	29
	4	2	10	5	2	5	12	16	21	6	6
Indirect Object	1	3	5	9	5	29	52	18	24	27	61
	2	26	21	21	38	26	7	26	19	18	6
	3	40	40	28	21	18	16	28	21	20	7
	4	10	13	21	15	6	4	7	15	14	5

TABLE C-3

FRIEDMAN TEST AND RANK CORRELATIONS

Sentence Type	Chi-Square	r'	Sentence Type	Chi-Square	r'
A/B/N	89.0**	.37**	P/B/N	86.3**	.36**
A/B/V	97.3**	.40**	P/B/V	79.0**	.32**
A/B/G	96.7**	.40**	P/B/G	31.6**	.12
A/B/D	69.0**	.28*	P/B/D	110.7**	.46**
A/B/I	7.3	.02	P/B/I	70.6**	.29**
A/F/N	35.4**	.14	P/F/N	61.5**	.25*
A/F/V	93.8**	.39**	P/F/V	56.8**	.23*
A/F/G	93.6**	.39**	P/F/G	3.7	.003
A/F/D	26.7**	.10	P/F/D	50.5**	.21
A/F/I	39.6**	.16	P/F/I	100.4**	.42**

* p<.05 ** p<.01

TABLE C-4

PERCENT DISTRIBUTION OF FIRST RANK

Item Ranked	Active/Back					Active/Forward				
	N	V	G	D	I	N	V	G	D	I
Verb	18	57	16	16	14	16	66	11	10	16
Agent	70	35	77	39	42	58	29	86	54	37
Dir.Obj.	9	8	6	44	11	10	3	3	29	3
Ind.Obj.	4	0	0	0	33	15	3	0	6	44

Item Ranked	Passive/Back					Passive/Forward				
	N	V	G	D	I	N	V	G	D	I
Verb	23	49	9	9	13	11	59	15	9	13
Agent	8	8	34	1	5	8	13	41	8	4
Dir.Obj.	66	37	46	84	46	15	5	14	49	6
Ind.Obj.	4	6	11	6	37	66	23	30	34	77

TABLE C-5

PERCENT ASSIGNMENT OF FIRST RANK ACCORDING TO POSITION AND STRESS.

Item Ranked	Stress Location				
	Normal	Noun^1	Verb	Noun^2	Noun^3
Noun^1	65	81	31	39	43
Verb	17	12	58	14	12
Noun^2	11	5	5	44	11
Noun^3	7	2	6	4	34

APPENDIX D
FIRST TASK ANOVA RESULTS

TABLE D-1

VERB

Source	SSq	df	MSq	F
*S*s	587.83	78	7.54	
Voice (V)	1.58	1	1.58	2.86
Dative Position (DP)	1.71	1	1.71	2.40
Stress (C)	225.71	4	56.43	52.78***
*S*s x V	43.21	78	.55	
*S*s x DP	55.68	78	.71	
V x DP	.09	1	.09	.16
*S*s x C	333.57	312	1.07	
V x C	1.11	4	.28	.58
DP x C	7.11	4	1.78	3.26*
*S*s x V x DP	43.52	78	.56	
*S*s x V x C	148.58	312	.48	
*S*s x DP x C	169.98	312	.54	
V x DP x C	8.48	4	2.12	3.61**
*S*s x V x DP x C	183.15	312	.59	

TABLE D-2

AGENT

Source	SSq	df	MSq	F
*S*s	427.80	78	5.48	
Voice (V)	672.76	1	672.76	237.50***
Dative Position (DP)	.61	1	.61	.94
Stress (C)	162.41	4	40.60	41.35***
*S*s x V	220.95	78	2.83	
*S*s x DP	50.54	78	.65	
V x DP	.53	1	.53	.92
*S*s x C	306.39	312	.98	
V x C	12.58	4	3.15	4.71**
DP x C	2.17	4	.54	1.05
*S*s x V x DP	45.16	78	.58	
*S*s x V x C	208.41	312	.67	
*S*s x DP x C	160.40	312	.51	
V x DP x C	4.48	4	1.12	2.07
*S*s x V x DP x C	169.30	312	.54	

* $p<.05$ ** $p<.01$ *** $p<.001$

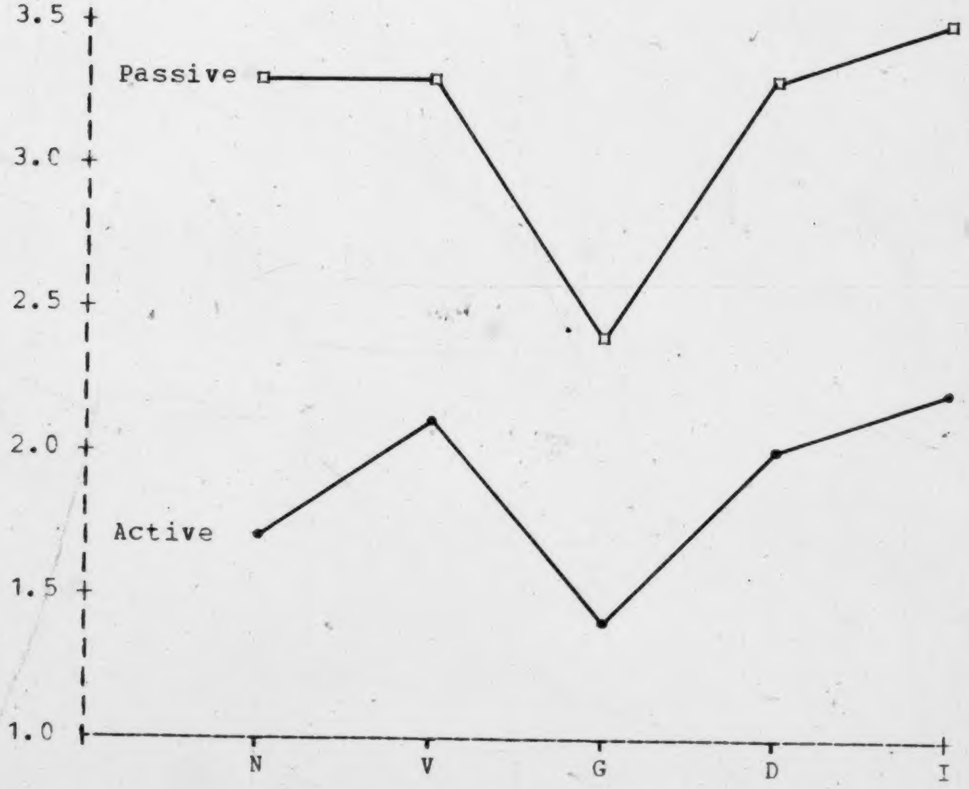

Fig. D-1. Voice by stress effects: Agent.

TABLE D-3

DIRECT OBJECT

Source	SSq	df	MSq	F
Ss	161.89	78	2.08	
Voice (V)	165.91	1	165.91	163.02***
Dative Position (DP)	179.13	1	179.13	252.34***
Stress (C)	124.49	4	31.12	30.19***
Ss x V	79.38	78	1.02	
Ss x DP	55.37	78	.71	
V x DP	1.23	1	1.23	1.32
Ss x C	321.60	312	1.03	
V x C	6.79	4	1.70	3.14*
DP x C	.89	4	.22	.40*
Ss x V x DP	72.67	78	.93	
Ss x V x C	168.88	312	.54	
Ss x DP x C	173.58	312	.56	
V x DP x C	8.72	4	2.18	3.31*
Ss x V x DP x C	205.14	312	.66	

TABLE D-4

INDIRECT OBJECT

Source	SSq	df	MSq	F
Ss	245.87	78	3.15	
Voice (V)	204.91	1	204.91	110.44***
Dative Position (DP)	127.60	1	127.60	166.29***
Stress (C)	168.26	4	42.07	48.64***
Ss x V	144.72	78	1.86	
Ss x DP	59.85	78	.77	
V x DP	.01	1	.01	.01
Ss x C	269.83	312	.86	
V x C	5.38	4	1.34	2.25
DP x C	11.92	4	2.98	5.24***
Ss x V x DP	79.84	78	1.02	
Ss x V x C	186.70	312	.60	
Ss x DP x C	177.35	312	.57	
V x DP x C	4.47	4	1.12	1.98
Ss x V x DP x C	176.18	312	.56	

* p<.05   ** p<.01   *** p<.001

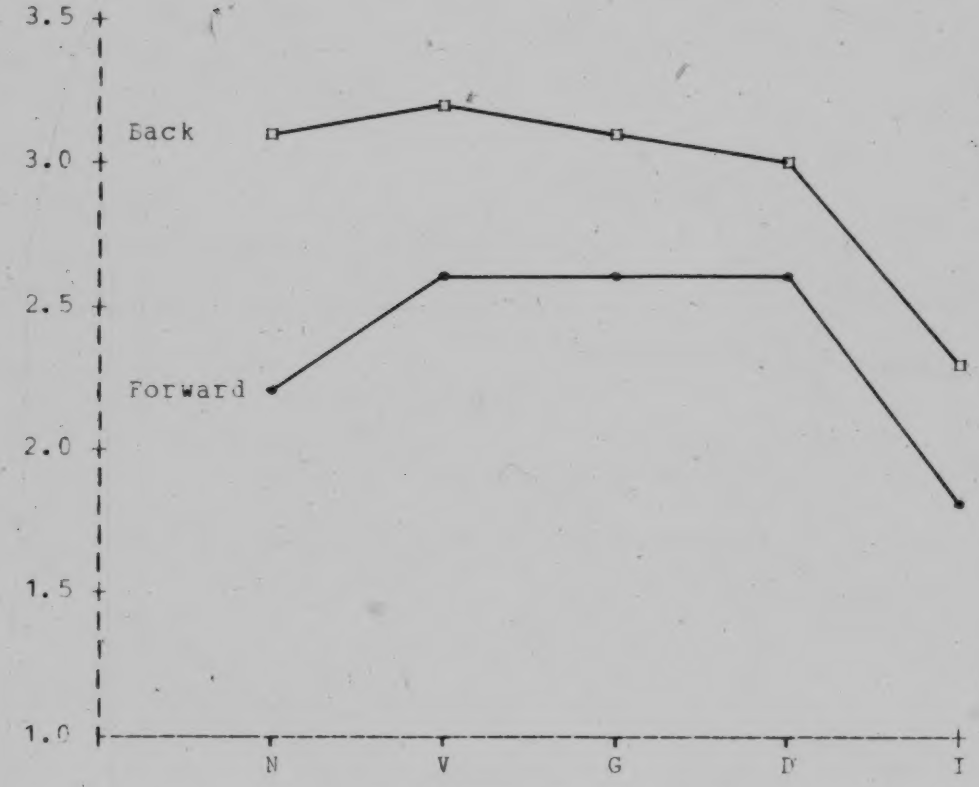

Fig. D-2. Dative position by stress effects: Indirect object.

TABLE D-5

MEAN RANKS: NORMAL AND CONTRASTIVE STRESS

Item Ranked	Stress Location	Active		Passive	
		Back	Fwd.	Back	Fwd.
Agent	Normal	1.54	1.82	3.37	3.23
	Agent	1.44	1.30	2.44	2.43
Direct Object	Normal	2.66	2.99	1.49	2.44
	Dir.Obj.	1.84	2.52	1.27	1.85
Indirect Object	Normal	3.46	2.72	2.72	1.65
	Ind.Obj.	2.52	2.13	2.01	1.44

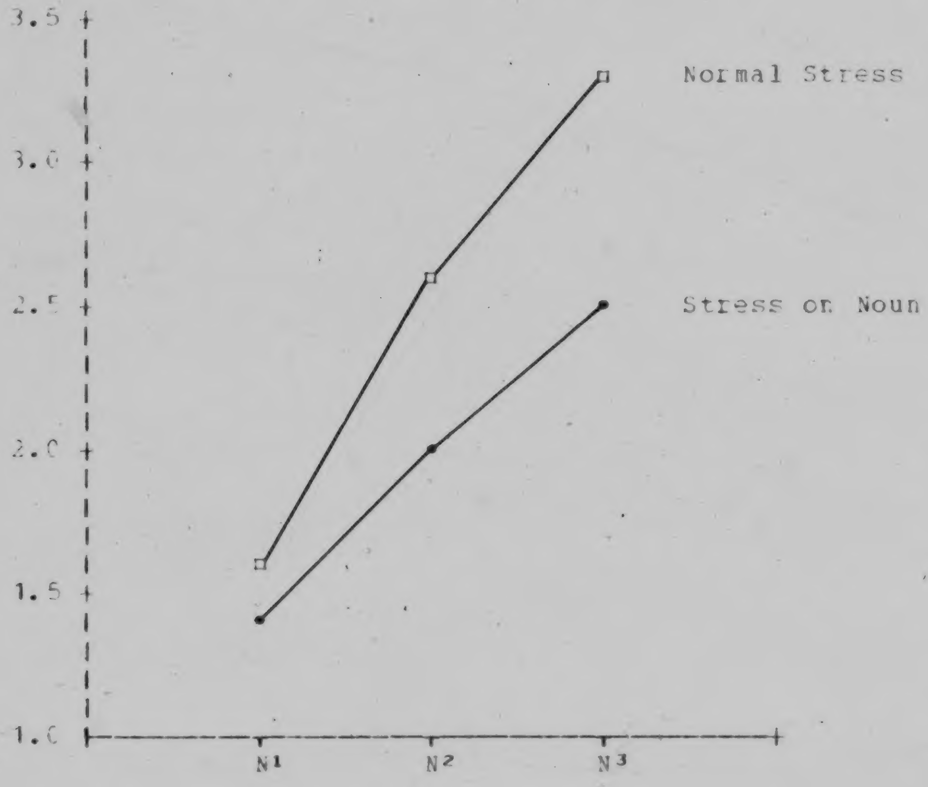

Fig. D-3. Effect on NP's of stress and position.

APPENDIX E
SECOND TASK RESULTS

TABLE E-1

DISTRIBUTION OF RANKS: ACTIVE SENTENCES

Item Ranked	Rank	Active/Back N	Active/Back V	Active/Back G	Active/Back D	Active/Back I	Active/Forward N	Active/Forward V	Active/Forward G	Active/Forward D	Active/Forward I
Verb/ Agent	1	38	51	51	27	29	36	51	39	35	38
	2	20	14	15	29	24	17	14	27	19	23
	3	10	6	5	12	11	13	8	4	15	9
	4	6	7	1	6	7	6	1	2	3	3
	5	4	0	4	5	6	4	3	3	4	2
	6	1	1	3	0	2	3	2	4	3	4
Verb/ Direct Object	1	10	15	11	19	15	6	4	3	8	5
	2	22	28	23	22	20	7	9	9	10	9
	3	17	23	16	20	22	13	17	20	15	11
	4	11	7	20	11	11	26	16	17	12	22
	5	5	4	5	3	5	17	27	16	19	22
	6	6	2	4	4	6	10	6	14	15	10
Verb/ Indirect Object	1	2	2	0	1	2	10	15	8	7	17
	2	4	3	7	6	6	32	18	18	29	23
	3	14	11	13	10	11	16	18	17	16	17
	4	19	18	17	21	18	8	19	20	16	11
	5	26	32	25	22	21	8	4	12	7	10
	6	14	13	17	19	21	5	5	4	4	1
Agent/ Direct Object	1	10	4	13	19	8	12	3	8	4	4
	2	16	11	13	11	3	3	9	6	5	6
	3	7	9	11	10	14	10	11	14	9	9
	4	19	26	17	14	22	11	12	15	15	14
	5	17	18	22	21	20	20	24	23	27	23
	6	10	11	3	4	12	23	20	13	19	23
Agent/ Indirect Object	1	5	2	3	2	11	12	6	19	10	12
	2	9	5	7	5	14	14	15	12	7	10
	3	8	8	15	11	7	5	9	8	9	7
	4	5	12	13	6	11	13	12	8	11	12
	5	15	13	5	20	9	15	10	11	12	11
	6	37	39	36	35	27	20	27	21	30	27
Direct Object/ Indirect Object	1	6	5	1	11	14	3	0	2	15	3
	2	8	18	14	6	12	6	14	7	9	8
	3	23	22	19	16	14	22	16	16	15	26
	4	19	9	11	21	10	15	19	17	22	17
	5	12	12	18	8	18	15	11	13	10	11
	6	11	13	16	17	11	18	19	23	8	14

TABLE E-2

DISTRIBUTION OF RANKS: PASSIVE SENTENCES

Item Ranked	Rank	Passive/Back					Passive/Forward				
		N	V	G	D	I	N	V	G	D	I
Verb/ Agent	1	1	5	5	1	2	4	7	11	4	4
	2	6	6	10	5	3	10	5	2	6	7
	3	12	11	9	14	8	6	13	9	5	6
	4	17	19	20	23	15	12	16	16	14	13
	5	27	22	21	19	32	23	26	22	26	28
	6	16	16	14	17	19	24	12	19	24	21
Verb/ Direct Object	1	50	54	34	49	37	14	22	12	20	11
	2	12	15	14	14	22	20	27	25	28	22
	3	8	4	18	7	11	24	14	20	18	26
	4	6	4	6	4	3	15	10	11	10	14
	5	2	1	2	3	2	5	1	5	1	5
	6	1	1	5	2	4	1	5	6	2	1
Verb/ Indirect Object	1	8	13	10	9	18	33	41	28	25	46
	2	33	38	27	37	28	23	16	24	29	13
	3	16	17	22	13	14	10	9	13	13	7
	4	10	6	10	10	10	6	5	5	4	6
	5	6	3	5	7	7	3	5	7	6	3
	6	6	2	5	3	2	4	3	2	2	4
Agent/ Direct Object	1	4	0	11	4	4	7	2	12	9	5
	2	3	2	5	4	5	5	7	10	3	5
	3	13	10	5	12	9	17	20	16	17	19
	4	14	7	15	13	20	19	21	14	17	17
	5	24	34	23	28	20	18	15	19	21	14
	6	21	26	20	18	21	13	15	8	12	19
Agent/ Indirect Object	1	7	2	8	2	8	4	3	8	4	1
	2	12	8	10	8	6	6	4	8	4	10
	3	13	22	11	21	14	9	8	11	11	11
	4	10	10	5	4	15	13	12	9	9	9
	5	9	7	13	13	4	11	16	10	16	17
	6	28	30	32	31	32	36	36	33	35	31
Direct Object/ Indirect Object	1	9	5	11	14	10	17	4	8	17	12
	2	13	10	13	11	15	156	21	10	9	22
	3	17	15	14	12	23	13	15	10	15	10
	4	22	33	23	25	16	14	15	24	25	20
	5	11	12	15	9	14	19	16	16	9	12
	6	7	4	3	8	1	1	8	11	4	3

TABLE E-3

FRIEDMAN TEST AND RANK CORRELATIONS

Sentence Type	Chi-Square	r'	Sentence Type	Chi-Square	r'
A/B/N	107.6**	.26*	P/B/N	124.4**	.31**
A/B/V	163.7**	.41**	P/B/V	182.2**	.45**
A/B/G	122.6**	.30**	P/B/G	75.4**	.18
A/B/D	120.1**	.30**	P/B/D	133.1**	.33**
A/B/I	72.4**	.17	P/B/I	130.3**	.32**
A/F/N	74.7**	.18	P/F/N	108.9**	.27*
A/F/V	115.0**	.28*	P/F/V	125.1**	.31**
A/F/G	82.0**	.20	P/F/G	68.6**	.16
A/F/D	84.1**	.20	P/F/D	127.8**	.31**
A/F/I	100.4**	.24*	P/F/I	123.6**	.30**

* $p<.05$ ** $p<.01$

TABLE E-4

PERCENT ASSIGNMENT OF FIRST RANK ACCORDING TO POSITION AND STRESS.

Item Ranked	Stress Location				
	Normal	Noun^1	Verb	Noun^2	Noun^3
Verb-N^1	50	59	62	40	40
Verb-N^2	16	12	21	23	14
Verb-N^3	4	3	6	18	12
N^1-N^2	15	18	6	18	12
N^1-N^3	8	5	3	4	11
N^2-N^3	7	3	3	10	16

APPENDIX F
THIRD TASK RESULTS

TABLE F-1

DISTRIBUTION OF RANKS: ACTIVE SENTENCES

Item		Active/Back					Active/Forward				
Ranked	Rank	N	V	G	D	I	N	V	G	D	I
Verb/	1	41	46	46	40	29	16	24	27	28	10
Agent/	2	8	20	14	23	19	26	29	22	26	18
Direct	3	13	3	9	7	9	17	17	18	13	20
Object	4	10	3	3	2	15	13	2	5	5	24
Verb/	1	7	10	6	9	12	27	34	24	15	34
Agent/	2	29	25	24	11	21	16	11	16	7	13
Indirect	3	18	20	27	15	20	17	15	16	20	19
Object	4	18	17	15	37	19	12	12	16	30	6
Verb/	1	8	12	6	6	15	9	8	6	13	11
Dir.Obj./	2	26	21	21	22	23	24	25	22	26	30
Ind.Obj.	3	19	22	16	30	20	22	24	19	19	17
	4	19	17	29	14	14	17	15	25	14	14
Verb/	1	16	4	14	17	16	20	6	15	16	17
Dir.Obj./	2	9	6	13	16	9	6	7	12	13	11
Ind.Obj.	3	22	27	20	20	23	16	16	19	13	11
	4	25	35	25	19	24	30	43	26	23	28

TABLE F-2

DISTRIBUTION OF RANKS: PASSIVE SENTENCES

Item		Passive/Back					Passive/Forward				
Ranked	Rank	N	V	G	D	I	N	V	G	D	I
Verb/	1	5	13	16	8	10	10	16	12	6	4
Agent/	2	25	27	21	18	21	20	20	29	33	20
Direct	3	21	18	23	26	16	20	22	18	19	21
Object	4	21	14	12	20	25	22	14	13	14	27
Verb/	1	5	8	7	3	5	10	12	17	5	14
Agent/	2	15	22	24	19	23	20	25	17	16	17
Indirect	3	26	26	22	18	25	24	21	24	17	26
Object	4	26	16	19	32	19	18	14	14	34	15
Verb/	1	49	45	36	48	47	32	36	31	46	47
Dir.Obj./	2	14	16	9	13	11	20	17	9	14	14
Ind.Obj.	3	6	8	8	9	10	8	10	9	9	4
	4	3	3	19	2	4	12	9	23	3	7
Verb/	1	13	6	13	13	10	20	8	12	15	7
Dir.Obj./	2	18	7	18	22	17	12	10	17	9	21
Ind.Obj.	3	19	20	19	19	21	20	19	21	27	21
	4	22	39	22	18	24	20	35	22	21	23

TABLE F-3

FRIEDMAN TEST AND RANK CORRELATIONS

Sentence Type	Chi-Square	r'	Sentence Type	Chi-Square	r'
A/B/N	21.9**	.09**	P/B/N	61.5**	.27*
A/B/V	72.5**	.33**	P/B/V	65.3**	.29*
A/B/G	51.2**	.23	P/B/G	9.9*	.03
A/B/D	53.7**	.24*	P/B/D	61.8**	.28*
A/B/I	9.6	.03	P/B/I	47.0**	.21
A/F/N	9.1*	.03	P/F/N	15.3**	.06
A/F/V	51.5**	.23	P/F/V	33.1**	.14
A/F/G	20.8**	.08	P/F/G	3.8	.004
A/F/D	22.7**	.09	P/F/D	55.5**	.25*
A/F/I	19.8**	.08	P/F/I	50.5**	.22

* p<.05 ** p<.01

APPENDIX G
SECOND TASK ANOVA: SIGNIFICANT INTERACTIONS.

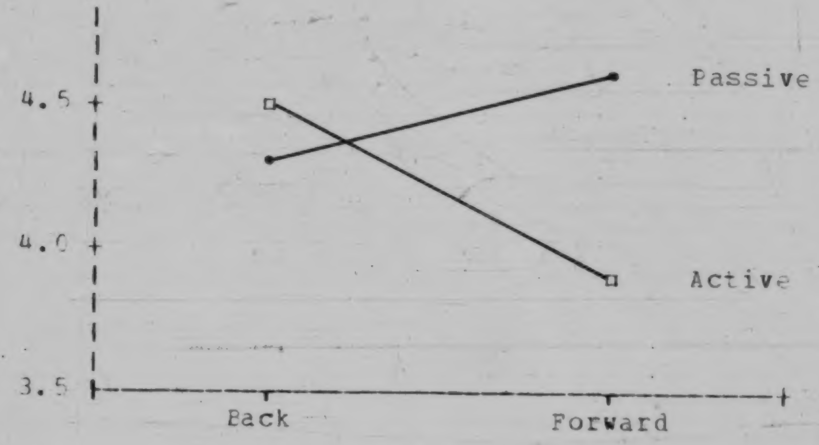

Fig. G-1. Voice by dative position effects: Agent - indirect object pair.

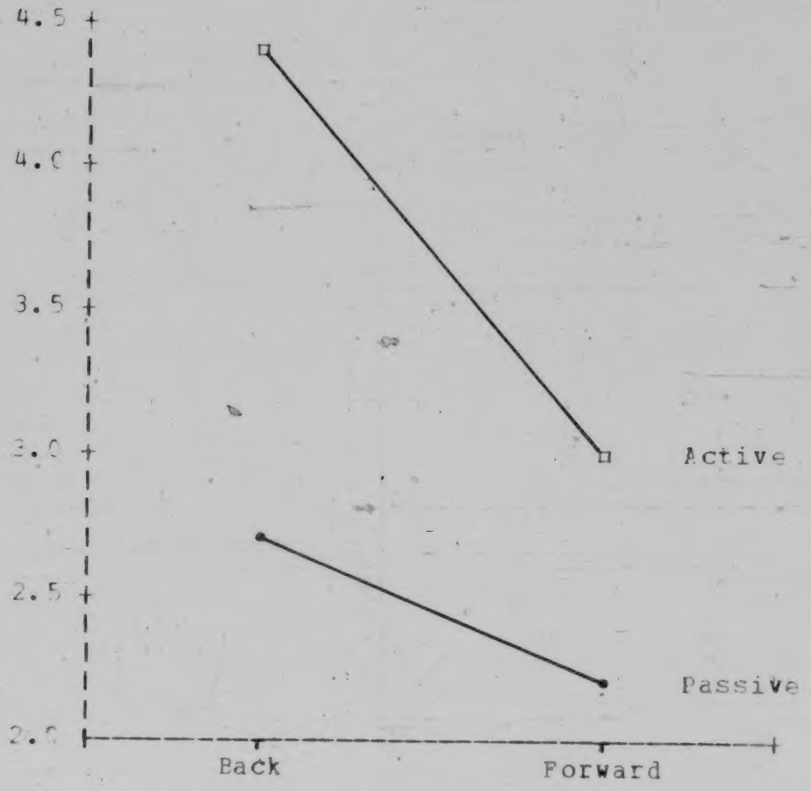

Fig. G-2. Voice by dative position effects: Verb - indirect object pair.